SIEMENS

SIREMOBIL Iso-C

SP

System Manual

Service Instructions

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- Circuit diagram for monitor X2080
- SIREMOBIL Iso-C logbook
- For the laser targeting device where used: Adjustment Instructions / Laser targeting device RXR2-130.032.01...

For SIREMOBIL Iso-C 3D additional

- SIREMOBIL Iso-C 3D Startup Instructions SPR2-230.815.01...
- Image Quality Quick Test SPR2-230.037.01 Revision 05 or higher

Required tools, measurement and auxiliary devices

• DMM	e.g. Fluke 8060A		97 02 101
• Oscilloscope > 50 MHz e.g. TFluke Combi Scope PM 3390A			99 00 861
• Dose measurement device	e.g. PTW-DIADOS		97 17 612
• Safety tester	e.g. BENDER Unimet 1100 ST		51 38 727
• Service PC with WINDOWS 3.1., 3.11 or 95 operating system			
• Service software (refer to SIREMOBIL Iso-C logbook)			
• Connection cable, Service-PC - SIREMOBIL Iso-C		e.g.	99 00 440
• 1 set of resolution tests		e.g.	28 71 820
• 1 set of radiation filters		e.g.	97 98 596
• Center cross		e.g.	96 60 051
• Heat conducting paste WPS		e.g.	20 48 650
• Special purpose oil (Optimol Optipit)			55 07 525
• Special purpose oil (Slic Pac PTFE)			55 07 517
• Sealing compound			20 49 716
• Standard service equipment*			
• 1 set Allen keys*			
• 200 N spring scale		e.g.	44 15 113
• Torque wrench 20 Nm to 100 Nm		e.g.	80 86 159
• Torque wrench 3 Nm to 20 Nm		e.g.	34 24 553
• A 30 mm socket key (is required for adjusting the brake)*			

For SIREMOBIL Iso-C 3D additional

• Calibration Phantom Iso-C 3D (without navigation interface)		71 39 947
or Calibration Phantom Iso-C 3D (with navigation interface)		75 51 620
• Luminance meter	e.g. SMfit light field lum. meter	88 81 281

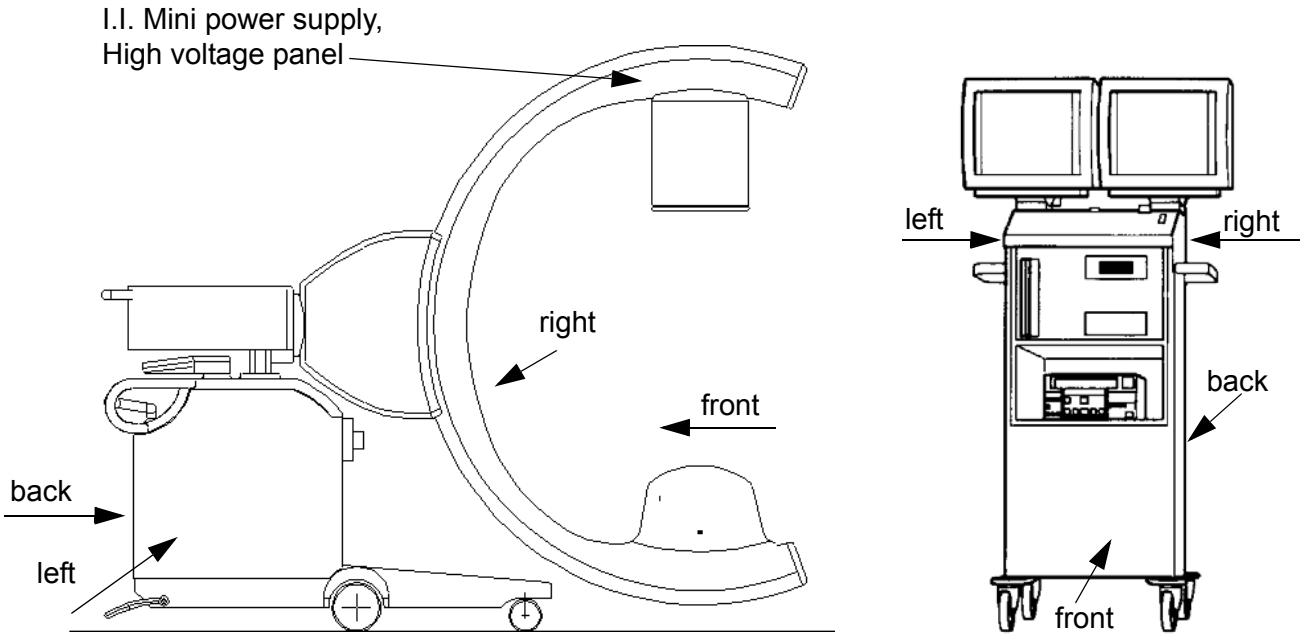

Fig. 1

Information regarding this document

These service instructions will assist you in adjusting the SIREMOBIL Iso-C for routine operation. Not every adjustment is required each time the system is serviced.

Position designations

The designations used in these instructions left, right, front and back are explained in Fig. 1.

Safety Information

⚠WARNING

Danger of possibly fatal physical injury and property damage!
Observe

- **the product-specific safety information in these instructions,**
- **the general safety information in the instructions TD00-000.860.01... and**
- **the general safety information according to ARTD Part 2.**

Noncompliance can lead to death, physical injury or property damage.

⚠WARNING

Electrical voltage!
Noncompliance can lead to death, physical injury or property damage.

Once the system covers have been removed, voltage-conducting parts become contactable. To prevent danger, always disconnect the system from the line voltage before removing the covers. To do this, pull the power plug or switch the system power supply off and secure the power switch against accidental activation.

If an uninterruptible power supply (UPS) is installed in the system, the power supply of the UPS must be switched free of voltage in addition or the voltage output plug must be pulled out.

If service in connection with electrical voltage is required, the general safety information in instructions TD00-000.860.01... must be observed.

⚠WARNING

Electrical voltage!
Noncompliance can lead to death, physical injury or property damage.

After service is performed on the primary circuit of the ON/OFF assembly (e.g. replacement of the ON/OFF assembly or any of its components) the device leakage current must be measured and recorded (see system manual or logbook).

⚠WARNING

Electrical voltage!
Noncompliance can lead to death, physical injury or property damage.

After completing service work and refitting all covers, a protective ground wire test must be performed according to ARTD-002.731.17.. . The protective ground wire resistance must not exceed 0.2 ohms.

⚠WARNING

Danger of infection with pathogens!
Noncompliance can lead to death or physical injury.

This product has been released for operation in operating rooms, and may therefore be contaminated with infectious blood or other excreta.
Any skin contact with blood or other excreta must be avoided! For this reason, you must strictly adhere to the preventive measures specified in ARTD-002.731.37... !

⚠WARNING

X-ray radiation!
Noncompliance can lead to illnesses, irreversible damage to body cells and the genotype, severe injuries and even death.

In work on the system in which radiation must be released, the radiation protection directives and the rules for radiation protection according to ARTD-002.731.02 must be complied with.

Note:

- **Use available radiation protection devices.**
- **Wear radiation protection clothing (lead apron).**
- **Keep your distance from the radiation source as large as possible.**
- **Release radiation only if necessary.**
- **Set the radiation activity as low as possible. (low kV and mA values, short radiation time)**
- **Release radiation for as short a time as possible.**

Checks in which radiation must be released are identified by the radiation warning symbol.

⚠WARNING

Risk of injuries on mechanical parts!
If not observed, slight to medium injuries, especially to the hands, can occur.

The C-arm of the system is manufactured from carbon fiber composite material (CFK). In case of damage of the carbon fiber structure, for example caused by collision or by cutting or scraping tools, individual carbon fibers or carbon fiber bundles can stand out and on contact cause injuries to the skin or penetrate into the tissue of the hand.

Before starting work on the C-arm, make sure that there is no damage to the carbon fiber structures (visual inspection).

If smaller superficial damage is detectable in the painted area or in the area of the running surface edges of the C-arm, wear working gloves and remove any projecting carbon fibers. Then carefully rub the damaged places flat with fine emery cloth and close the damaged surface with paint. A spray paint in the color of the C-arm can be used for this purpose (See Service Tool Catalogue). Remove any carbon fibers lying in the C-arm profile with a damp sponge or cloth.

If greater damage to the carbon fiber structure indicating persistent or large-scale destruction of the carbon fiber structure (e.g. crack formation or flaked off places in the running surfaces with torn carbon fibers) can be detected, then replace the C-arm.

⚠CAUTION

Electrostatic voltage!
Noncompliance can lead to property damage.

ESD protection guidelines must be observed when performing service.

⚠CAUTION

Risk of being burned by hot parts or components!
Noncompliance can lead to light or medium burns, especially of the hands.

Once the covers have been removed, parts or components (e.g. power components, heat sinks, solenoid brakes) become contactable which may develop temperatures of 50° Celsius when in operation. To prevent burns, switch the system power supply off before contacting any parts or components and let the system cool off for at least 5 minutes before resuming work.

⚠CAUTION

Danger of injury when dismantling / assembling mechanical parts! Non-compliance can lead to minor up to moderately severe injuries, especially to the hands!

If parts that are under mechanical stress have to be dismantled or assembled, as for example the cover over the horizontal carriage of the basic unit, inattention can cause injuries due to crushing, cutting or grazing the skin, especially to the hands.

Perform the corresponding work with special care and attentiveness.

Wear working gloves if necessary.

⚠CAUTION

Danger of injury on mechanical parts!
Non-compliance can lead to minor up to moderately severe injuries, especially to the hands!

With covers removed, you can come into contact with parts such as for example flat plugs, threaded bolts, cut off cable ties or edges of components on which, in the case of inattention, injuries can arise due to crushing, cutting or grazing the skin, especially to the hands.

Perform the corresponding work with special care and attentiveness.

Notes on the protective conductor resistance test

Observe the instructions in the safety rules for installation and repair (ARTD-002.731.17 ...).

The protective conductor resistance must be measured after every intervention in the system.

Documentation of the measured values is normally required only during periodical safety checks.

If parts / components decisively influencing the protective conductor resistance are replaced (e.g. replacement of the power cable, replacement of the power-up module, replacement of multicore connection cables, which also create the protective conductor connection between parts of the system (e.g. monitor cable or C-arm cable)), or if protective conductor connections have been repaired, then the protective conductor resistance must be measured, documented and assessed.

The measurement must be made according to DIN VDE 0751, Part 1 (see ARTD Part 2). In this case the protective conductor resistance to all conductive touchable parts of the system must be measured.

Make sure that control cables or data cables between the components of the system do not imitate any protective conductor connection.

During the measurement the mains cable and additional connection cables which also create the protective conductor connection between parts of the system (e.g. monitor cable between basic unit and monitor cart) must be moved section by section to detect broken conductors.

The protective conductor resistance must not exceed 0.2 Ohms.

The values must be recorded and assessed as repeat measurements in the protective conductor resistance record stating the measuring points.

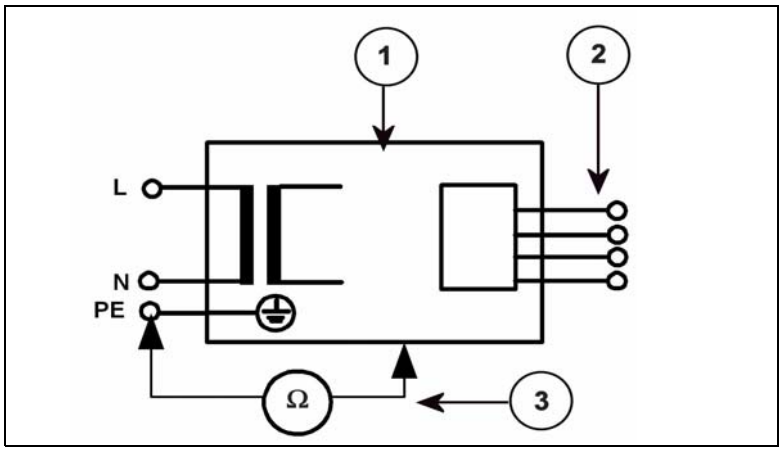

Fig. 2 Measuring circuit for measuring the protective ground wire resistance for units that are disconnected from power, in compliance with DIN VDE 0751-1:2001-10, Fig. C2.
1 = System
2 = Applied part (if present)
3 = Measuring arrangement (integrated in measuring instrument)

NOTE

Evaluate the results by comparing the first measured value with the corresponding values of preceding maintenance procedures or safety checks.
A sudden or unexpected increase of the measured values may indicate a safety-relevant defect - even if the limit value of 0.2 Ohms is not exceeded (protective ground wire or contacts).

Notes on device leakage current measurement

Observe the instructions in the safety rules for installation and repair (ARTD-002.731.17 ...).

⚠WARNING

Electric voltage!
Noncompliance can lead to severe injuries and even death.

The device leakage current measurements may be performed on systems of protection class I only after the protective conductor test has been passed.

First measured value

In most cases, the first measured value has already been determined and documented in the device leakage current record.

The measurement was performed with the recorded line voltage, line frequency and with the recorded measuring equipment.

If the local line voltage or line frequency deviates from the line voltage or line frequency documented in the record (e.g. change of location with different local line voltage / line frequency), or if no documented measured values are available, then perform the device leakage current measurement. Mark the old values as invalid. Cross out the values, enter the comment "invalid values" and confirm with name, date and signature.

Adjust/program the system to the local line voltage / line frequency before the measurement.

Measurement

Perform the measurement according to DIN VDE 0751, Part 1 (see ARTD-002.731.17....), and record the value determined as the first measured value.

Measurement of the device leakage current according to the residual current procedure (measuring arrangement according to Fig. 2) must be given preference, since no danger for the person performing the measurement or any other persons arises during the measurement.
However, please note the minimum resolution of the leakage current measuring instrument and any additional manufacturer's data restricting the use of the measuring instrument.

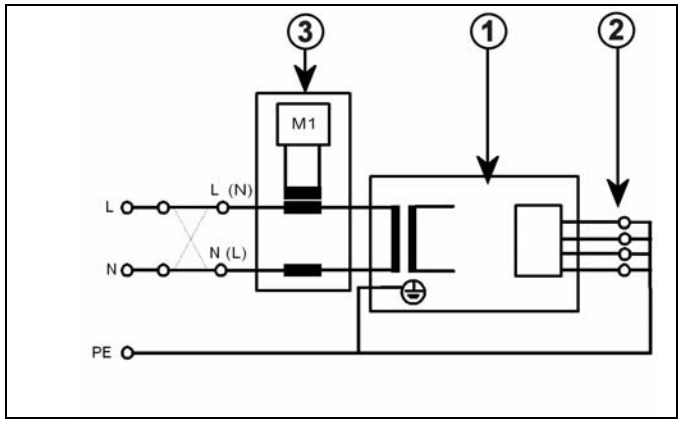

Fig. 3 Measurement circuit for measuring the device leakage current using the residual current procedure in compliance with DIN VDE 0751-1:2001-10, Fig. C6 for Protection Class I.
1 = System
2 = Applied part (if present)
3 = Measuring arrangement (integrated in measuring instrument)

If the direct measurement of the device leakage current is used (measuring arrangement according to Fig. 3), then the system must be set up insulated during the measurement and must not be touched during the measurement.

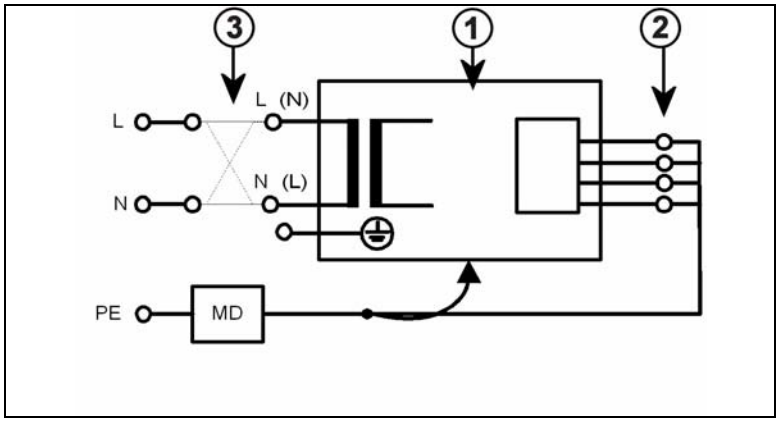

Fig. 4 Measurement circuit for direct device leakage current measurement in compliance with DIN VDE 0751-1:2001-10, Fig. C5 for Protection Class I
1 = System
2 = Applied part (if present)
3 = Measuring arrangement (integrated in measuring instrument)

⚠WARNING

Electric voltage!
Noncompliance can lead to severe injuries and even death.
In the direct measurement of the device leakage current (measuring arrangement according to Fig. 2) the protective conductor is no longer connected with the protective conductor of the power socket. In the first case of fault, voltages up to the level of the line voltage can therefore occur on the protective conductor / housing of the system.
Housing parts of the system must not be touched during the measurement.
Third-person access to the system must be prevented.

The system must be switched on during the measurement. Measuring instruments with automated measuring sequences must therefore be set to manual measurement.

Enter the highest value as first measured value in the device leakage current record.

This value must not exceed the permissible leakage current values according to DIN VDE 0751-1:2001-10, Table F.1, line "Device leakage current for devices according to remarks 1 and 3", of 2.5 mA.

Measure and record the current line voltage. If the measured line voltage deviates from the nominal voltage, then correct the measured value to the value corresponding to a measurement at the nominal value of the line voltage. Document this in addition.

Document the measuring procedure (residual measurement or direct measurement) and the measuring instrument used (designation and serial number).

File the record sheet in the system folder or logbook with the existing records.

Repeat measurement

When service or repair work is performed on the primary power supply circuit (e.g. repairs to the power-on circuit or replacement of the line filter), the device leakage current measurement must be repeated.

The same measuring conditions as in the first measurement apply.

Record and assess the highest value determined in the repeat measurement in the existing device leakage current record.

This value must not exceed the permissible leakage current values according to DIN VDE 0751-1:2001-10, Table F.1, line "Device leakage current for devices according to remarks 1 and 3", of 2.5 mA.

Measure and record the current line voltage. If the measured line voltage deviates from the nominal voltage, then correct the measured value to the value corresponding to a measurement at the nominal value of the line voltage. Document this in addition.

Document the measuring procedure (residual measurement or direct measurement) and the measuring instrument used (designation and serial number).

.

NOTE

Evaluate the results by comparing the first measured value with the corresponding values of preceding maintenance procedures or safety checks.
A sudden or unexpected increase of the measured values may indicate that a fault has occurred in the primary circuit of the power supply (damaged insulation, damage caused by water ingress or humidity, defective interference suppressor, etc.) - even if the limit value of 2.5 mA is not exceeded.

Covers

⚠WARNING

Electrical voltage!
See Chapter 1, Safety Information.

Disconnect the line voltage plug prior to removing covers.

Basic system

Removing the cover

- Apply the foot brake.
- Remove the screws from the cover.
- Pull the cover back.
- Unscrew the protective conductor from the cover.
- Pull the cover completely off and remove it.

Installing the cover

- Reattach the protective conductor to the back cover.
- Push the cover forward.
- Replace the cover and tighten the screws.

Cover over the horizontal carriage

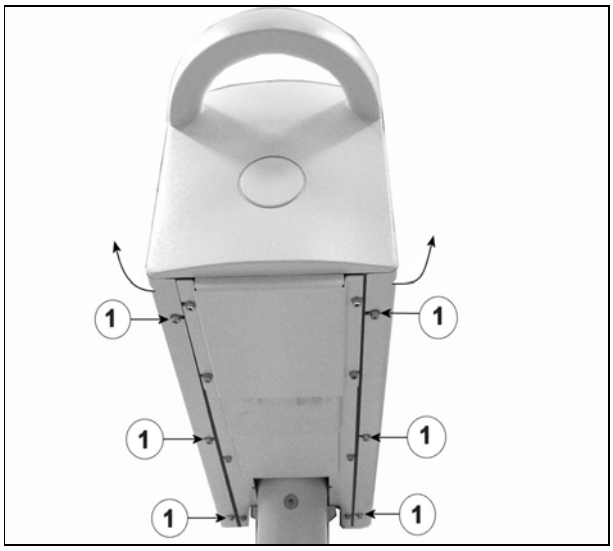

Fig. 5

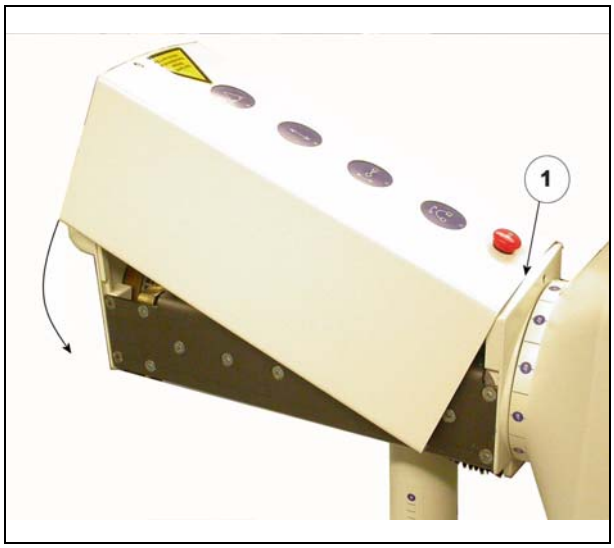

Fig. 6

Removing the cover

- Loosen the 6 mounting screws (1/Fig. 2).

⚠CAUTION

Danger of injury when dismantling / assembling mechanical parts! Non-compliance can lead to minor up to moderately severe injuries, especially to the hands!

The cover over the horizontal carriage is bent U-shaped and must be pulled on the side to the outside when it is removed.
The cover is then under mechanical stress.

We recommend that you wear light working gloves to avoid injuries.

- Expand the cover at the rear end in the direction of the arrow (see Fig. 2) and remove it downwards.
- If needed disconnect the protective ground wire, the cable of the keypad (brake buttons) and the cable of the emergency stop button.

Attaching the cover

- Re-fasten or connect the protective ground wire, the cable of the keypad (brake buttons) and the cable of the emergency stop button.

⚠CAUTION	**Danger of injury when dismantling / assembling mechanical parts! Non-compliance can lead to minor up to moderately severe injuries, especially to the hands!** **When the cover is attached and pressed down, it is under mechanical stress and snaps into place over the bottom edge of the horizontal carriage.** **Expand the cover at the rear end (see Fig. 2) far enough that, as shown in Fig. 3, it lies obliquely over the horizontal carriage in the edge, 1/Fig. 3.** **Press on the top surface of the cover without grasping the sheet metal edges, until this slides over the lower edge of the horizontal slide.**

- Expand the cover at the rear end (see Fig. 2) far enough that, as shown in Fig. 3, it lies obliquely over the horizontal carriage in the edge, 1/Fig. 3.
- Press on the top surface of the cover without grasping the sheet metal edges, until this slides over the lower edge of the horizontal slide. Here, make sure that the cover does not slide out from the edge (1 / Fig. 3).
- Check the operation of the emergency stop button and of the brake buttons.
- Fasten the cover with the 6 Allen screws (1/ Fig. 2).
- MODULARIS only:
  Tightening force of the Docking Plate 18 Nm must be observed (see service instructions for MODULARIS)

SIREPHOS cover

NOTE	**The SIREPHOS is surrounded by a C-arm cover to adapt it to the form of the C-arm. This cover is sealed all around with a sealing compound (20 49 716) to prevent any contamination of the unit by the SIREPHOS or the C-arm.**

- Loosen the 4 cover screws of the surrounding C-arm housing.
- Use a sharp knife to cut open the sealing compound all the way around the cover.
- Lift off the C-arm cover. The 3 cover screws of the SIREPHOS cover are now accessible.
- Remove the sealing compound residue from the C-arm cover, the SIREPHOS cover and the C-arm.
- Loosen the 3 cover screws of the SIREPHOS cover.
- Lift off the cover.
- On completing service, place the SIREPHOS cover on the SIREPHOS.
- Refasten the SIREPHOS cover with the 3 cover screws.
- Re-attach the C-arm cover and seal it all around with sealing compound.
- Use a paper towel to wipe off excess sealing compound.
- Refasten the C-arm cover with the 4 cover screws.

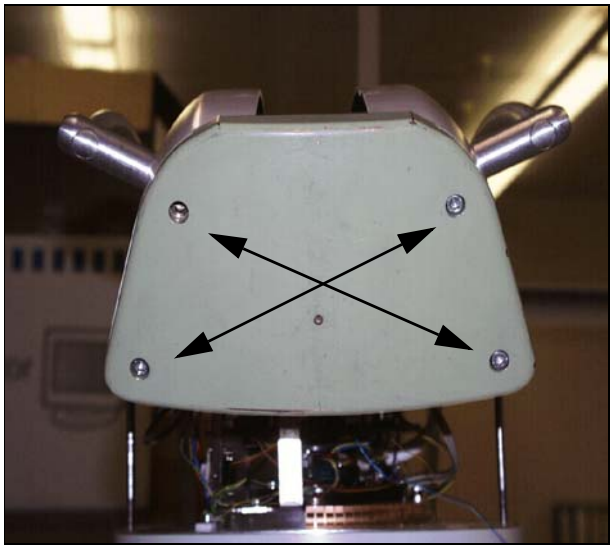

Fig. 7

Installing/ removing the C-arm covers

⚠WARNING

Risk of injuries on mechanical parts!
If not observed, slight to medium injuries, especially to the hands, can occur.

Observe the notes concerning the C-arm carbon fiber structure.

⚠CAUTION

Risk of injury!
Noncompliance can lead to light to medium injuries and/or property damage.

The C-arm covers contain counterbalance weights and weigh approx. 6 kg.
Hold the covers firmly when installing or removing them.

Before the C-arm cover will be loosened, the C-arm must be moved to its middle orbital position.
If the C-arm covers are loosened, the C-arm may not be moved to its orbital end positions (I.I. or SIREPHOS at the orbital end position).

- Remove the 4 mounting screws (Fig. 2). Hold the covers firmly while removing them.
- Install them following the same procedure in the reverse order.

Monitor trolley

Removing the covers

- Remove the upper back cover plate of the logbook compartment.
- Remove the protective conductor.
- Remove the lateral Allen screws from the lower back cover.
- Remove the protective conductor from the cover.

Installing the covers

- Begin with the lower back cover.
- Reattach the protective conductor for the lower cover.
- Install the cover and tighten the screws.
- Reattach the protective conductor for the upper back cover plate.
- Install the cover and tighten the screws.

Installing/removing the cover at the C-arm mounting

- Remove the cover screws and remove both covers from the side.
- After completing the procedure, reinstall both covers in the reverse order.

Telescoping cover underneath the horizontal carriage

- Remove the four lower screws.
- Slightly loosen the two front screws and remove the telescoping cover from the bottom.

Fig. 8

I.I. service position

⚠WARNING

Risk of injuries on mechanical parts!
If not observed, slight to medium injuries, especially to the hands, can occur.

Observe the notes concerning the C-arm carbon fiber structure.

Moving the I.I. into the service position

- Take the service screws from the kit supplied.
- Move the C-arm into the vertical position, with the I.I. below and the SIREPHOS above.
- Remove both attachment screws for the I.I. and replace them with the service screws.
- Insert the service screws at least 5 turns into the threaded holes of the I.I.
- Hold the I.I. firmly and turn the C-arm so that the I.I. is above and the SIREPHOS is below (Angulation).
- Hold the I.I. firmly and carefully remove it from the C-arm. Be careful not to damage the cable.

Installing the I.I.

- Move the C-arm into the vertical position with the I.I. below, the SIREPHOS above.
- Holding the I.I. firmly, carefully lift it up. Be careful of the cable.
- Holding the I.I. firmly, move the C-arm so that the Sirephos is above and the I.I. is below (Angulation).
- Carefully insert the I.I. into the C-arm. When doing this, be careful not to damage the cable.
- Remove both the service screws from the threaded holes of the I.I. and reinstall both the attachment screws.

Concluding steps

After completing all work, perform the protective conductor test (refer to ARTD-002.731.17).

⚠WARNING

Electrical voltage!
See Chapter 1, Safety Information.

Disconnect the SIREMOBIL Iso-C line voltage plug.

- Open the back cover of the monitor trolley.
- Measure the on-site line voltage and line frequency.
- Adjust transformer T1 to the required line voltage and line frequency. Refer to the label on the switch-on assembly.
- Adjust transformer T2 to the required line voltage and line frequency. Refer to the label on the switch-on assembly.
- Check fuses F1 and F2 to see if they correspond with the values on the label of the switch-on assembly and replace them, if necessary.
- Mark the correct line voltage and line frequency on the line voltage label at the back of the monitor trolley.

Checking the line voltage on the monitor trolley

- Jumper X10 for the basic system must be disconnected.
- The monitor, memory device and other devices, if present, such as multiformat camera, video printer or video recorder must be disconnected from the line voltage supply.

Check the secondary voltages for line voltage transformer T1 according to table 1.

	from test point	to test point	Voltage	Comment
	Transformer T1.31	Transformer T1.32	190 V ~ to 205 V ~	cannot be adjusted
	Transformer T1.31	Transformer T1.33	230 V ~ to 246 V ~	cannot be adjusted
	Line voltage cable MEMOSKOP, N	Line voltage cable MEMOSKOP, L	230 V ~ to 246 V ~	cannot be adjusted
	Line voltage cable Monitor 1, N	Line voltage cable Monitor 1, L	230 V ~ to 246 V ~	cannot be adjusted
Option:	Line voltage cable Monitor 2, N	Line voltage cable Monitor 2, L	230 V ~ to 246 V ~	cannot be adjusted
Option:	Line voltage cable MULTISPOT, N	Line voltage cable MULTISPOT, L	230 V ~ to 246 V ~	cannot be adjusted
Option:	Line voltage cable Video printer, N	Line voltage cable Video printer, L	230 V ~ to 246 V ~	cannot be adjusted
Option:	Line voltage cable Video recorder, N	Line voltage cable Video recorder, L	230 V ~ to 246 V ~	cannot be adjusted

Tab. 1

Option:	Optical isolation line voltage cable, N	Optical isolation line L voltage cable	230 V ~ to 246 V ~	cannot be adjusted

Tab. 1

Low voltages

Check the operating voltages for the SIREMOBIL Iso-C against the values in table 1.

from test point	to test point	Voltage	Potentiometer
D1.X31 (0V)	D1.X30 (+5 V)	+ 5.0 V to 5.2 V	M14. +5 V/Adj.
D1.X34 (0V)	D1.X32 (+15 V)	+ 14.9 V to 15.1 V	M14. +15 V/Adj.
D1.X34 (0V)	D1.X33 (-15 V)	- 14.8 V to - 15.2 V	M14. -15 V/Adj.
D30.X1.8 (0V)	D30.X1.9 (+24 V)	+ 24.0 V to 29.6 V	not adjustable
D30.X21.1 (0V)	D30.X21.10 (+24 V)	+ 22.8 V to + 29.5 V	not adjustable
D30.X20.1 (0V)	D30.X20.3 (+27 V)	+ 27.3 V to + 27.8 V	D30 R115
M13.S- (0V)	M13.S+ (+13 V)	+ 13.1 V to 13.3 V	M13.TR1

Tab. 1

I.I. Voltages

The voltages E1 / E2 / E3 and A may be taken from the I.I. test protocol and checked or adjusted against the control test points listed in table 2.

Voltage	Test point	Ground point (0V)	Potentiometer for full format	Potentiometer for zoom format	Voltage divider ratio
E1	UE1	⊥	P10	P11	1:1
E2	UE2	⊥	P6	P7	1:1
E3	UI 15	⊥	P2	P3	1:10000
30 kV, Anode	UI 30	⊥	P1	P1	1:10000

Tab. 2

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Control board D1, Host

- Connect the service PC to the serial service interface on SIREMOBIL Iso-C.
- Start the service program.
- Insert the "Parameter" diskette in drive A.
- Select the Download menu and start download (ARC / Fil / Host).
- After successfully downloading, wait for the system to boot (1 minute).
- The SIREMOBIL Iso-C is operational.

NOTE

If you cannot run download (e.g. power failure during download):
- Switch the SIREMOBIL Iso-C off and back on
- Restart download

Storage of the error log as ASCII file

- If you store the error log using the backup function of the service program, the error log will be stored as a binary file and can't be read with a word editor.
  For easier evaluation of the error log, it is also possible to store it as ASCII file.
  For easier service support from the USC or HSC, please send the error log as an ASCII file.

NOTE

The parameter diskette must be in drive A, before the start of the service program and during the service work. Without a parameter diskette in drive A, the short error messages will not be stored in the error log file and the text "no error text available" is stored behind the error codes.

Prerequisites:
The service PC is already connected, the service program is already started.

- Select the menu "Diagnostics...."
- Select the menu "Error log".
- Click on the button "Get from unit". Wait until the error log is transferred to the service PC.
- Click on the button "Export to file".
- Select your hard disk drive for storage of the file.
- For the file name, please enter the current date, the part number and the serial number of the unit as described in the example.

Example:	The current date is (DD-MM-YY):	29-03-01
	The unit part no. Is:	28 29 450
	The unit serial no. IS:	01234
	Enter the file name:	22-03-01_28 20 450_01234.txt

- Store the file on the hard disk drive of the service PC, to a path of your choice.
- Exit the service program.
- Copy the previously stored file to a formatted, empty one.

Option 3D Reconstruction, Trace File and Event Log File

Saving trace files

NOTE

On occurrence of an error the trace is filed date and time as Zip file in the operating system on drive C:\trace\trace_Vxxx_####.zip

- Insert an empty formatted floppy disk in drive A of the Syngo PC.
- In Syngo select the "local service" menu and enter the service key.
- Activate the button "Copy Trace to Drive A" (see Fig. 1).
- All available trace files are copied onto the floppy disk as Zip file.

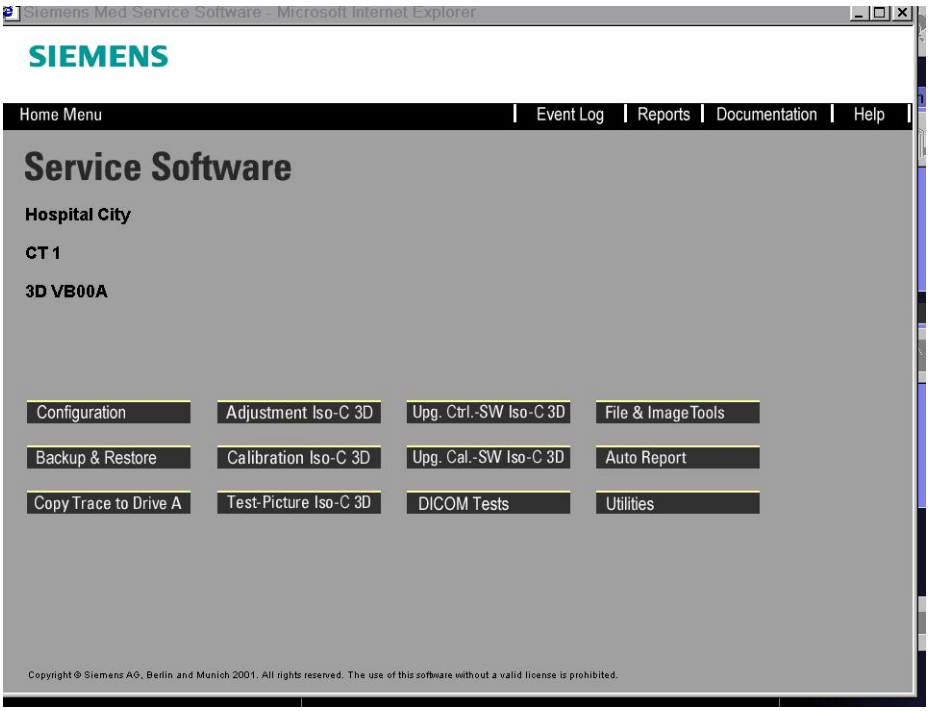

Fig. 1

NOTE

In the copying process, all already available older files are also copied until a floppy disk is full, but the youngest always first. Vxxx = SW-Version, e.g. VB00A; #### = error number, e.g. 1136

Saving current trace files directly after display of an error

- Each time the system is switched on a trace file **SPETrace_00.TRC** is created and written and filed under the drive **C:\Trace\SPETrace_00.TRC**.
  The current error trace can be saved via "local service" Utilities, source, "escape to OS".
- Insert an empty formatted floppy disk in drive A of the Syngo PC.
- In Syngo select the "local service" menu and enter the password.
- Activate the "Utilities" button.
- Under Source activate "Escape to OS".
- In the Parameters line enter "copy C:\traces*.trc A:" and then activate the "Go" button.
  The trace files are copied to floppy disk.
- Wait until the confirmation is displayed in the window.

Fig. 2

Saving the Event-Log files

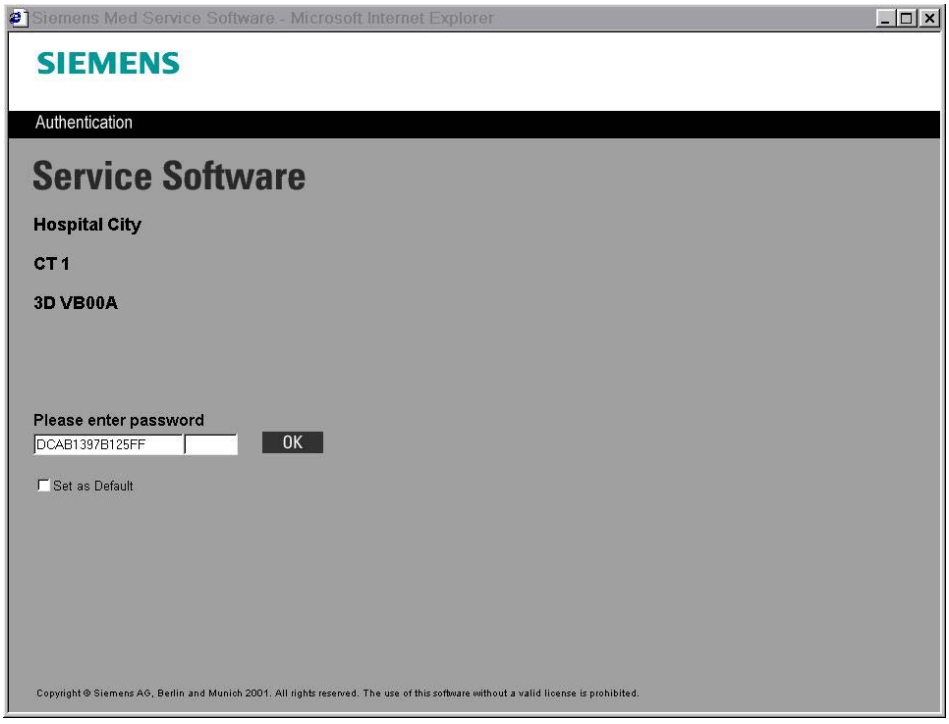
Siemens Med Service Software - Microsoft Internet Explorer
SIEMENS
Authentication
Service Software
Hospital City
CT 1
3D VB00A
Please enter password
DCAB1397B125FF
OK
Set as Default
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Fig. 3

- Put in Servicekey and confirm with "OK".

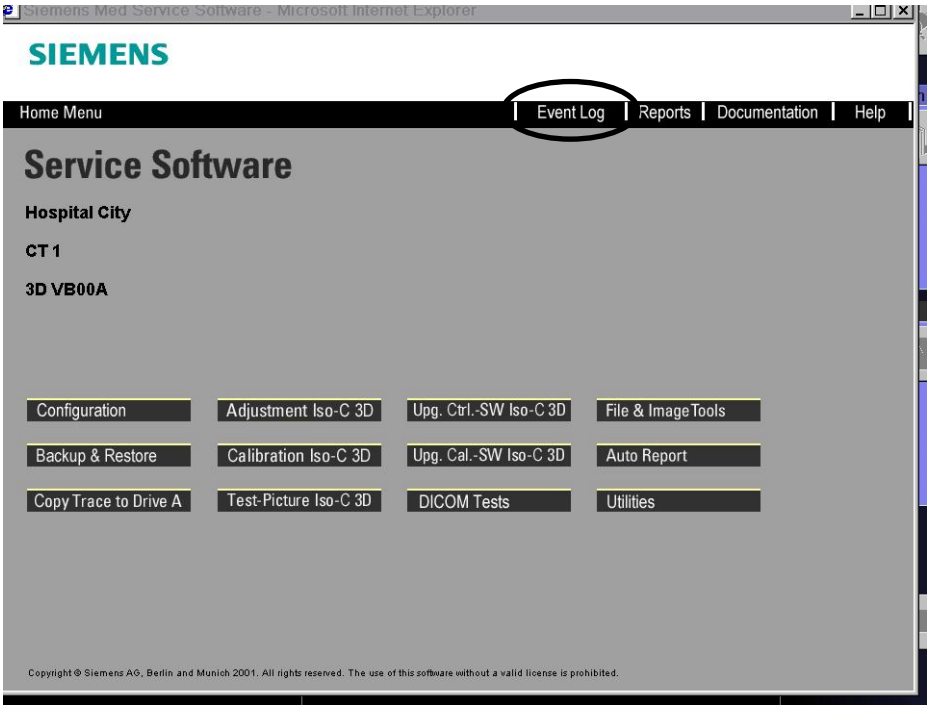


Fig. 4

- Select EventLog.

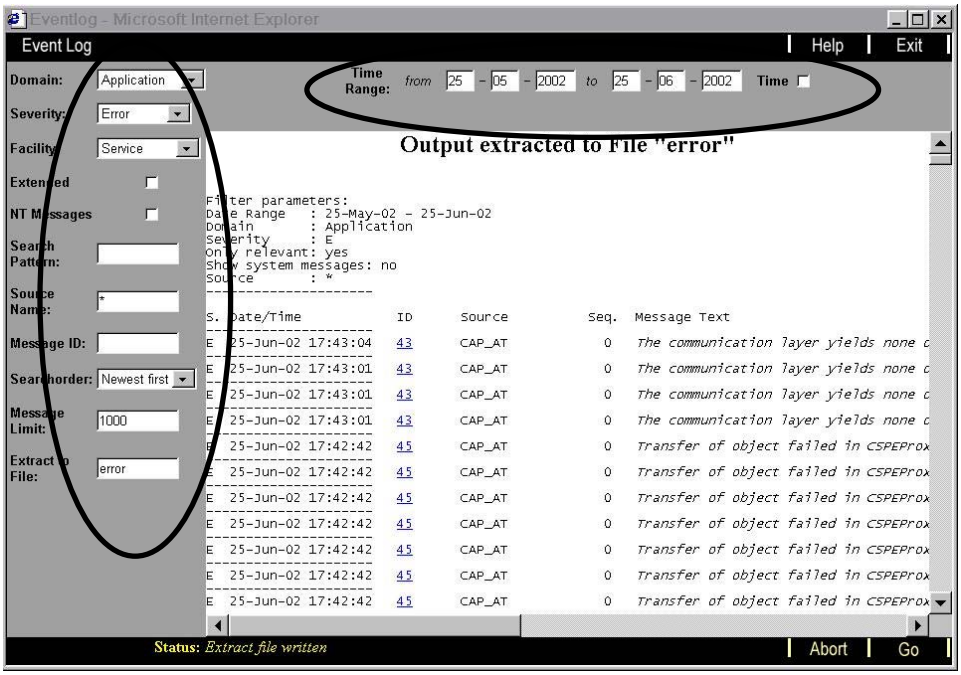


Fig. 5

- Select Time Range -> Minimum 1 month.
- Notice following settings.
  Domain: Application
  Severity: "Error" oder "All" ("All" contain all informations)
  Facility: Service
  -> Source Name: "SP_ISO"
  Message Limit: ca. 1000
  Extract to File: error
- Select "Go" -> The errors will be listet.
- Close EventLog.

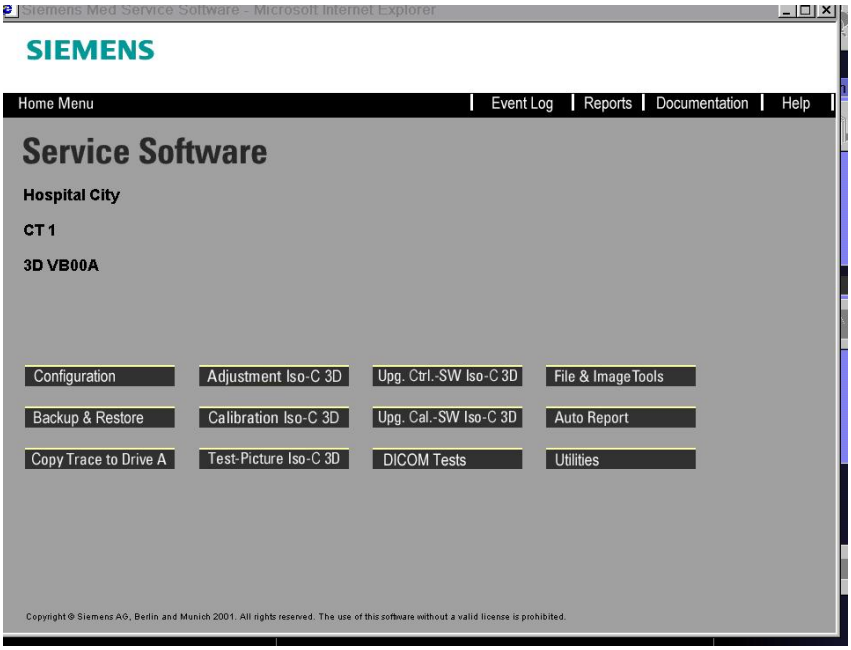


Fig. 6

- Select Utilites.

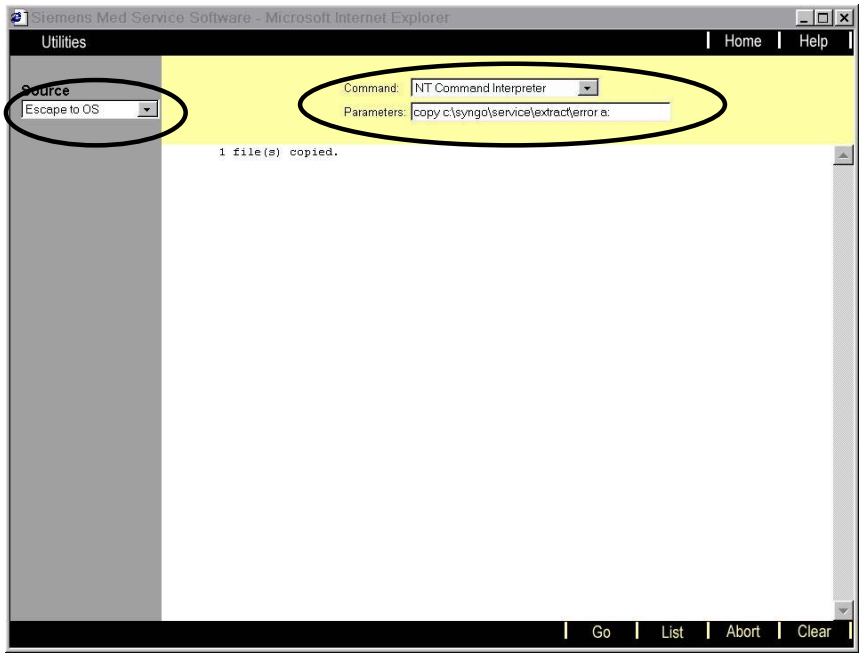


Fig. 7

- Insert a disk.
- Select "Escape to OS".
- Parameters: **copy c:\syngo\service\extract\error a:**.

Select "Go" -> Error File will be written to disk.

NOTE

The kV offset adjustment has to be followed by the generator adjustment (filament circuit learning program).
Always perform the kV offset adjustment prior to beginning the generator adjustment.

- Connect the service PC to the serial interface of the SIREMOBIL Iso-C.
- Start the service program.
- Select the Diagnostic menu.
- Select the Monitoring menu.
- Select "KV offset adjustment in the "Group 1" Combo box.

⚠WARNING

X-ray radiation!
See Chapter 1, Safety Information.

Observe the need for radiation protection. Wear a lead apron.

- Click on "Update Start".
- After the "Start fluoro" message in the ACTIONS line, press the radiation release button on the SIREMOBIL Iso-C SIREMOBIL Iso-C hand switch.

NOTE

After the "KV error break" message in the STATUS line, click on "Update Stop". Wait approximately 10 seconds.
Click on "Update Start" again. After the "Start fluoro" message in the ACTIONS line, press the radiation release button on the SIREMOBIL Iso-C hand switch. Refer to the text which follows for additional procedures.

- Continue to hold the radiation release button as long as the message "Continue fluoro" is displayed in the ACTIONS line.
- Release the radiation release button as soon as the message "Stop monitoring" appears in the ACTIONS line.
- Click on "Update Stop".
- Perform the generator adjustment (filament circuit learning program).

Generator Adjustment (Filament circuit learning program)

NOTE **The kV offset adjustment must be performed prior to starting the generator adjustment.**

NOTE **If an error occurs during the generator adjustment, switch OFF the SIREMOBIL Iso-C and perform the kV Offset and generator adjustments again.**

NOTE **As soon as the generator adjustment is started, press the radiation release button on the hand switch until the "Stop monitoring" message appears in the ACTIONS line. If you deactivate radiation too soon, the generator adjustment must be completely repeated. Exception: You can briefly stop pressing the radiation release button (less than 30 seconds) during the warmup phase (warmup displays in the STATUS line on the service PC) of the SIREPHOS. The generator adjustment continues when the radiation release button is pressed again.**

- Connect the service PC to the serial interface on board D1.
- Start the service program.
- Select the Diagnostic menu.
- Select the Monitoring menu.
- In the "Group 1" Combo box, select "Generator adjustment".
- Click on "Update Start".

⚠WARNING **X-ray radiation!**
See Chapter 1, Safety Information.

Observe the need for radiation protection. Wear a lead apron.

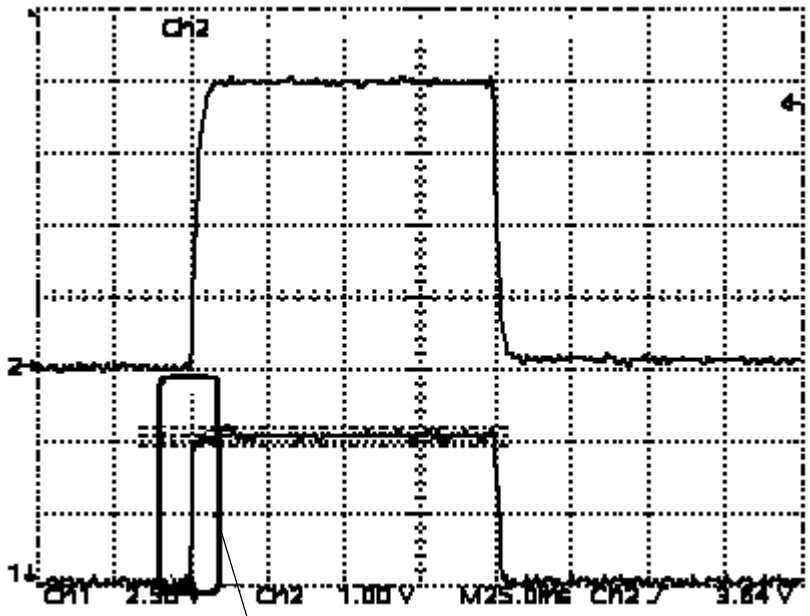
- After the "Start fluoro" message in the ACTIONS line, press the radiation release button on the SIREMOBIL Iso-C hand switch.
- Continue to hold the radiation release button as long as the message "Continue fluoro" is displayed in the ACTIONS line.
- "Warmup" appears in the STATUS line, the SIREPHOS is warming up.
- After approximately 8 minutes, the message "learning pushfactor" will appear in the STATUS line.
- A maximum of 15 exposures will automatically be released.
- The message "Learning done" appears in the STATUS line after the generator adjustment has been successfully completed.
- The "Stop monitoring" message appears in the ACTIONS line.
- Activate the radiation release button.
- Click on "Update Stop".

- Switch the SIREMOBIL Iso-C OFF and back ON again.

Checking the generator adjustment

- With the system on, connect the service PC to the SIREMOBIL Iso-C.
- Select "Test..." in the Diagnostic menu.
- Select cassette simulation in "Function Groups" .
- Select cassette switch ON in "Available Functions". The SIREMOBIL Iso-C is now in direct exposure mode.
- Select 81 kV with the kV+ / kV- keys.
- Select 8 mAs with the mAs+ / mAs- keys.
- Connect oscilloscope channel 1 to D1.X46, ground at 0V.
  Set the sensitivity to 1V / Div.
- Connect oscilloscope channel 2 to D1.X48, ground at 0 V.
  Set the sensitivity to 2.5V / Div.
- Set the time to 25 ms / Div.
- Set the oscilloscope on storage mode.

- Release an exposure with the hand switch and store the oscillogram with the exposure.
- Evaluate the stored oscillograms.
  The tube current must reach the tolerance range of 13 mA $\pm$ 1.5 mA in the time of 3 ms and may not leave this range for the next 6 ms.
  (The tube current may not run above 14.5 mA within the first 6 ms).
- Refer also to oscillograms in Fig. 1 / Fig. 1a and Fig. 1b.
- Select "Cassette switch off" on the service PC in "Available Functions". Direct exposure mode is cancelled.
- If the unit exceeds the tolerance range, the generator adjustment must be repeated.



kV-act (20 kV = 1.0 V)

mA-act (2.5 mA = 1.0 V)

relevant time period

Fig. 1

Error examples:

Tube current exceeds the upper limit
- preset filament current too high

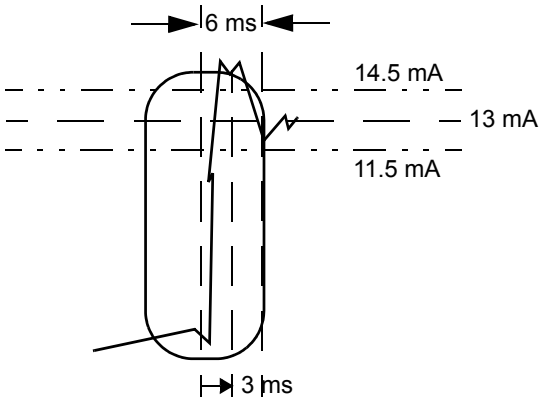


Fig. 1a

Tube current exceeds the lower limit
- preset filament current too low

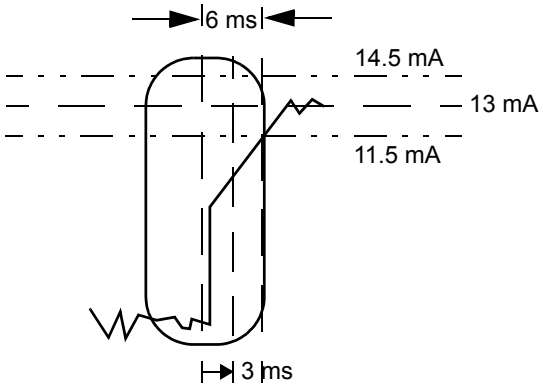


Fig. 1b

Dose rate adjustment

Prerequisites

- The "Adjustment mode" parameter in the "Doserate adjustment" parameter group has been programmed to "semi-automatic" .

Preliminary steps

- Switch on SIREMOBIL Iso-C.
- Connect the service PC to the serial interface of the SIREMOBIL Iso-C.
- Start the service program.
- Select the "Diagnostics..."menu.
- Select the "Monitoring..."menu.
- Select the "Doserate adjustment" menu from the Combo Box "Group 1" .
- Click on the button "Update Start".
- The following is displayed on the service PC:

AUTO REGULATION	indicates the current status of the automatic adjustment. (active / not active / manual / done)
BRIGHTNESS DEVIATION	shows the difference in the actual brightness value minus the nominal brightness value.
CONTROL CURVE	shows the currently selected fluoro curve (default: S2, antiiso-watt 5 mA)
ADJUSTMENT	shows the operating control mode. (Generator / Camera Iris / Stop)
I.I. ZOOM STATUS	shows the current I.I. format (survey / zoom)
DOSERATE	shows the dose rate selected. (LOW / MID / HIGH)
TV-IRIS NOMINAL VALUE	shows the stored or nominal TV-iris value from the learning phase. Note: An offset value is added to this value. For this reason, the TV-IRIS NOMINAL VALUE and TV-IRIS ACTUAL VALUE differ despite the correct adjustment (BRIGHTNESS DEVIATION 0 $\pm$ 3).
TV-IRIS ACTUAL VALUE	shows the actual TV iris value.

- Select the I.I. survey format (refer to the I.I. ZOOM STATUS).
- Insert 25 mm Al and 2.1mm Cu at the radiation exit port of the SIREPHOS.
- Center the dose measurement chamber on the I.I. input screen and attach.
- The grid remains on the I.I.

Correction factors:

- Grid correction factor 23cm (9") I.I.: 1.5 / 27 cm (11") I.I.: 1.5
- Dose measurement chamber correction factor for Dali and Nomex: 1.06

Dose rate to be set at the I.I. input screen:

I.I. type	I.I. format	Dose rate		
		LOW	MID	HIGH
23 cm (9") I.I.	Survey	111 nGy/s	185 nGy/s	370 nGy/s
23 cm (9") I.I.	Zoom	157 nGy/s *	262 nGy/s	523 nGy/s

I.I. type	I.I. format	Dose rate		
		LOW	MID	HIGH
27 cm (11") I.I.	Survey	85 nGy/s	140 nGy/s	280 nGy/s
27 cm (11") I.I.	Zoom	165 nGy/s *	262 nGy/s	523 nGy/s

***NOTE**

For LOW dose rate levels in zoom format:

Due to the maximum possible opening of the TV iris, deviating dose rate values are acceptable, if the dose rate level is set at LOW in zoom format.

When the dose rate level is set at LOW in the zoom format, the minimum position value (= minimum opening) of the TV iris may be the same value as in the survey format. (Opening of TV iris collimator in zoom format >= opening of TV iris collimator in survey format).

When the dose rate level is set at LOW in zoom format, the display "BRIGHTNESS DEVIATION" may show a value greater than ± 3.

If the value shown in "BRIGHTNESS DEVIATION" is greater than ± 3, you must read out and evaluate the position values of the TV iris collimator when the dose rate level is set to LOW in both the zoom and survey formats:

(Service PC, Menu Adjustments... / Parameters.../ Doserate adjustment, Parameter LOW - Zoom format pos. and Parameter LOW Full format pos.)

Acceptable parameter values are:
LOW - Zoom format pos. >= LOW - Full format pos.

Unacceptable parameter values are:
LOW - Zoom format pos. < LOW - Full format pos.

Setting the dose rate for survey format

- On the service PC, click on the "Update Start" button.
- Select the I.I. survey format.
- Center the dose measurement chamber on the I.I. input screen and attach.

- Use the key to select the dose rate (LOW / MID / HIGH, shown in the "DOSERATE" line).

- Apply fluoro briefly until the generator finishes regulating the automatic fluoro adjustment.
- Select KV STOP at the system operating console.
- Switch on fluoro.
- Set the dose rate with the [+kV] and [-kV] keys. (Dose rate * grid correction factor).
- The resulting KV value should be between 70 to 80 kV. If necessary, change the prefiltration and set the dose rate again using keys [+kV] or [-kV]. Refer to the table.
- Switch off fluoro.
- Remove the dose measurement chamber from the I.I. input screen.

- Switch on fluoro.
- Press the [>0<] at the system operating console. This starts the automatic adjustment procedure for the TV- iris collimator.
- Wait until the message "done" appears in the "AUTO REGULATION" line.
- The "BRIGHTNESS DEVIATION" value is shown in the "BRIGHTNESS DEVIATION" line and should be 0 ± 3 .
- Switch off fluoro.

Setting the dose rate for zoom format

refer also to notice on previous page *

- KV-STOP remains selected.
- Center the dose measurement chamber on the I.I. input screen and attach.
- Select the I.I. zoom format (refer to "I.I. ZOOM STATUS"). The KV values remain the same. The mA values, however, are automatically increased by a factor of 1.41.
- Use the [mA+] and [mA-] keys to set the dose rate for the zoom format (Dose rate *grid correction factor).
- Press the [>0<] key at the system operating console. This starts the automatic adjustment procedure for the TV-iris collimator.
- Wait until the message "done" appears in the "AUTO REGULATION" line.
- The "BRIGHTNESS DEVIATION" value is shown in the "BRIGHTNESS DEVIATION" line and should be 0 ± 3. Refer also to notice on previous page *
- Switch off fluoro.
- Select the next level of dose rate (LOW / MID / HIGH) and repeat the dose rate setting for the survey and zoom format for this level.

Concluding steps

- After setting all dose rates for the survey and zoom formats, click "Stop Update" and wait until "CAL" disappears from the 7 segment indicator to the right on the operating console. The TV- iris collimator values are stored to the EE-PROM of the host.
- Press ESC at the service PC to return to the main menu.
- Select the "Data, Backup..." menu.
- Click "Parameter" in the backup window.
- Then click "Backup" .
- Enter" dose rate set" under "Remarks for Parameter".
- Then click "OK" . The parameters are stored to disk.
- You can now exit from the service program.

Checking the dose rate in automatic mode

NOTE	**Checking the dose rate in zoom format with a dose rate measurement chamber that is not completely irradiated may lead to incorrect measurements.**

- Center and reattach the dose measurement chamber to the I.I. input screen. .
- Set the kV-mA curve HC1 (3mA plateau curve). If necessary, temporarily program the HC1 curve.

- During automatic mode (kV STOP is off), check the dose rate for dose rate levels LOW / MID / HIGH for the survey and zoom format.Take into account the correction factors for the grid and the dose measurement chamber. If necessary, temporarily change the dose rate levels and kV-mA curves.
  Tolerance margin for the dose rates: ± 15%.
- Set the kV-mA curve HC2 (5 mA plateau curve). If necessary, temporarily program the HC2 curve.

- During automatic mode (kV STOP is off), check the dose rate for dose rate levels LOW / MID / HIGH for the survey and zoom format.Take into account the correction factors for the grid and the dose measurement chamber. If necessary, temporarily change the dose rate levels and kV-mA curves.
  Tolerance margin for the dose rates: ± 15%.

Setting the maximum skin dose rate

NOTE **Setting the maximum skin dose rate is necessary only for countries where DHHS regulations apply.**

Prerequisites

- You must program one of the FL curves S2, HC2 or IODINE.
- The FL curves S2, HC2 or IODINE should be used for the following adjustment.
- The X-ray tube cover must be installed.
- Use the dose ionization chamber of the dose measurement device to measure dose rates greater than 10R/min.
- If you are using an area dose product measurement device, mount the dose measurement chamber above the radiation exit port of the SIREPHOS.

Preparations

- Attach the dose ionization chamber at a distance of 30 cm from the I.I. housing (Fig. 2).
- Select one of the FL curves S2 / HC2 or IODINE according to the programming. (Push-key)

- Briefly release fluoro.
- Select kV stop mode and enter 110 kV (5 mA).

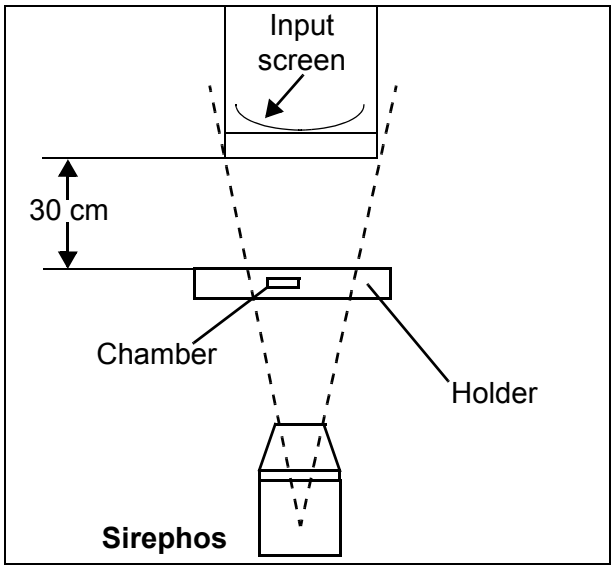


Fig. 2

NOTE **If the maximum tube current was already reduced, the mA value displayed at 110kV should be recorded and used for the calculation. The maximum skin dose rate to be set should equal 9R/min.**

Measurement

- Switch on fluoroscopy.
- Read and record the value displayed on the dose rate meter.
- If the value measured exceeds 9 R/min, the maximum tube current must be reduced. If the value measured is less than 9 R/min, the tube current does not need to be reduced.
- Switch fluoroscopy off.

- Calculate the maximum tube current.

$$\frac{\text{tube current displayed at 110kV in mA} * \text{9 R/min}}{\text{measured dose rate value in R/min}} = \text{tube current to be programmed in mA}$$

- Multiply the tube current to be programmed by 10 , since entry on the service PC must be made in 1/10mA. Round off the value to the nearest whole number.

Example: Tube current displayed at 110kV: 5mA
Maximum skin dose rate: 9R/min
Measured dose rate value : 10.2 R/min.

$$\frac{5\ (\text{mA}) * 9\ (\text{R/min})}{10.2\ (\text{R/min})} = 4.41\ (\text{mA})$$

Rounded to the nearest whole number: 44

The value to be programmed is 44.

Programming

- Connect the service PC to the serial interface of board D1.
- Select the "Adjustment, Parameters" menu.
- In the Combo box "Parameter Groups" select "Limitation of skin dose rate (FL)".
- Click on "Get from unit".
- Enter the value to be programmed in "Value".
- Click on "Set Value".
- Select "Put to unit". Read the menu guide on the service PC.
- Select "Save to file".
- The value to be programmed has been transferred to the SIREMOBIL Iso-C and temporarily stored to the disk.

NOTE

You must exit the service program with "Logoff" and "Quit". Only then will the modified parameters be stored on the floppy disk as a new file.

Checking

- After programming, check the maximum skin dose rate again.

Collimator, X-Iris

NOTE	**Because of the mechanical hysteresis of the semi-transparent slot diaphragm, open the collimator blades to maximum aperture, prior to adjusting the radiation iris.**

⚠WARNING	**X-ray radiation!** **See Chapter 1, Safety Information.** **Observe the need for radiation protection. Wear a lead apron.**

- Attach the center cross in the center of the image intensifier input screen.
- Connect the service PC to the serial interface of the SIREMOBIL Iso-C.
- Start the service program.
- Select the "Adjustment, Calibration" menu.
- Answer the query with "yes".
- Select "X-Iris" in the "Function Groups" combo box.
- In the window "Available Functions:" select "1. Init (Limits Off / Autosearch)" and click on Execute.
- Close the status window by clicking on the OK button.
- For the query "Do you want to reset the Unit", click "No".
- The X-Iris can now be completely opened and closed with the X-Iris keys.
- Select I.I. survey format.

- During fluoroscopy, adjust the X-Iris by opening and closing it with the X-Iris keys so that the collimator blades are still visible along the edge of the I.I.
- Select "2. II. - Full Format Position" on the service PC and click on "Execute" .
- Close the status window by clicking on the OK button.
- For the query "Do you want to reset the Unit", click "No".
- Switch to zoom format.

- During fluoroscopy, adjust the X-Iris by opening and closing the X-Iris keys so that the collimator blades are still visible along the edge of the I.I.
- Select "3. II. - Zoom Format Position" on the service PC and click on "Execute" .
- Close the status window by clicking on the OK button.
- For the query "Do you want to reset the Unit", click "No".
- Open the X-Iris completely.
- Select "4. CEX Position" on the service PC and click on "Execute" .
- Close the status window by clicking on the OK button.
- For the query "Do you want to reset the Unit", click "No" .

- Close the X-Iris completely.
- Release fluoroscopy. The X-Iris must close to < 4.5 cm .

- Select "5. CLOSED POSITION" on the service PC and click on "Execute".
- Close the status window by clicking on the OK button.
- For the query "Do you want to reset the Unit", click "NO".
- Select "8. Init Off & Store Positions" on the service PC and click on "Execute" .
- Close the status window by clicking on the OK button.
- For the query "Do you want to reset the Unit", click "Yes".
- Switch the SIREMOBIL Iso-C OFF and ON.

- Check the X-Iris again in survey format and zoom format. The collimator blades must still be visible on the edge of the image. If necessary, repeat the adjustment.
- Return to the main menu on the service PC with the ESC key.
- Select the Data, Backup... menu.
- Select Parameter in the backup window.
- Click on "Backup".
- At "Remarks for Parameter" enter "X-Iris set".
- Click on "OK" . The new position values for the collimator will be stored on the disk.
- Return to the main menu with the ESC key.

Collimator, slot diaphragm

Prerequisites

- Camera rotation has been adjusted correctly.
- Image reversal functions are disabled.
- The "SLOT DIAPHRAGM", "TYPE OF DIAPHRAGM" parameter has been programmed for "DISPLAY YES".

Adjustment

- Connect the service PC to the serial service interface.
- Start the service program.
- Select the Adjustment, Calibrations...menu.
- Respond to the query with yes.
- In the Combo box "Function Groups:" select "Slot Diaphragm".
- In the window "Available Functions:" select "Disable circle mask" and click "Execute. The circle mask of the Memoskop is switched off.
- Close the status window by clicking on the OK button.
- Respond to the query "Do you want to reset the unit" by clicking "No" .
- In the window "Available Functions:" select "Init" and the "Execute".
- Close the status window by clicking on the OK button.
- Respond to the query "Do you want to reset the unit" by clicking "No" .

- The mechanical limits are checked and the position values are automatically stored.
- Camera rotation is automatically moved to the 0 degree position.
- The X-Iris is opened to max.aperture.
- Switch off Zoom .
- Attach a centering cross or equivalent object to the I.I. for evaluating the position of the fluoro image.

⚠WARNING

X-ray radiation!
See Chapter 1, Safety Information.

Observe the need for radiation protection. Wear a lead apron.

- Switch on fluoro and move the slot diaphragm to the 0 degree position using the keys for rotating the slot diaphragm. The blades should be in the vertical on the monitor screen.
- Switch off fluoro.
- In the window "Available Functions:" select "0 DEGREE POSITION" and click "Execute".
- Close the status window by clicking on the OK button.
- Respond to the query "Do you want to reset the unit" by clicking "No" .

- Switch on fluoro.
- Open the slot diaphragm to where the blades begin to disappear at the edge of the image.
- Switch off fluoro.
- In the window "Available Functions:" select "FULL FORMAT POSITION" and click "Execute".
- Close the status window by clicking on the OK button.
- Respond to the query "Do you want to reset the unit" by clicking "No".
- Select the zoom format.

- Switch on fluoro.
- Open the slot diaphragm to where the blades begin to disappear at the edge of the image.
- Switch off fluoro.
- In the window "Available Functions:" select "ZOOM FORMAT POSITION" and click "Execute".
- Close the status window by clicking on the OK button.
- Respond to the query "Do you want to reset the unit" by clicking "No" .
- In the window "Available Functions:" select "Enable circle mask" and click "Execute"
- Respond to the query "Do you want to reset the unit" by clicking "No" .
- In the window "Available Functions:" select "INIT OFF & STORE POSITION" and click "Execute".
- Close the status window by clicking on the OK button.
- Respond to the query "Do you want to reset the unit" by clicking "Yes". The adjustment values are stored.

Concluding steps

- Switch off the system and switch it back on again.
- Return to the main menu by pressing ESC at the service PC.
- Select the "Data, Backup..." menu.
- Click "parameter" in the Backup window.
- Then click "Backup" .
- Enter "slot diaphragm adjusted" under "Remarks for Parameter".
- Then click "OK" . The new position values are stored to disk.
- You can now exit from the service program.

Collimator displays on the monitor

Prerequisites

- Camera rotation, collimators for X-Iris and slot diaphragm must be set correctly.

⚠WARNING	**X-ray radiation!** **See Chapter 1, Safety Information.** **Use radiation protection! Wear a lead apron!**

Collimator display, X-Iris

- Connect the service PC to the serial interface of the SIREMOBIL.
- Start the service program.
- Select the "Adjustment, Calibrations..." menu.
- Respond to the query with "Yes".
- Select "Screen Display COLLIMATOR" in the "Function Groups:" combo box.

Start adjustment

- In the "Available Functions:" window select "Init" and click on "Execute". The X-Iris is automatically opened to full format and the slot diaphragm is opened to maximum aperture.

Full format, X-Iris open

- Zoom must be disabled.

- Release fluoro and wait until generator has performed automatic adjustment.
- Switch fluoro off. The X-Iris is displayed on the monitor.
- Use the keys for opening and closing the X-Iris to set the diameter of the superimposed circle to the size of the X-iris.
- In the "Available Functions:" window select "Open Pos - II. Full Format" and click on "Execute".
- Close the status window by clicking on the OK button.

- For the query "Do you want to reset the unit", click on "No". The X-Iris is automatically closed to the smallest format.

Full format, X-Iris closed

- Briefly release fluoro. The X-Iris is displayed on the monitor.
- Use the keys for opening and closing the X-Iris to set the diameter of the superimposed circle to the size of the X-Iris.
- In the "Available Functions:" window select "Close Pos - II. Full Format" and click on "Execute".
- Close the status window by clicking on the OK button.
- For the query "Do you want to reset the unit", click on "No".
- The X-Iris remains in the minimum position.
- Zoom format is automatically selected.

Zoom format, X-Iris closed

- Briefly release fluoro. The X-Iris is displayed on the monitor.
- Use the keys for opening and closing the X-Iris to set the diameter of the superimposed circle to the size of the X-Iris.
- In the "Available Functions:" window select "Close Pos - II. Zoom Format" and click on "Execute".
- Close the status window by clicking on the OK button.
- For the query "Do you want to reset the unit" click on "No".
- The X-Iris is opened automatically.
- Zoom format remains selected.

Zoom format, X-Iris open

- Briefly release fluoro. The X-Iris is displayed on the monitor.
- Use the keys for opening and closing the X-Iris to set the diameter of the superimposed circle to the size of the X-Iris.
- In the "Available Functions:" window select "Open Pos - II. Zoom Format and click on "Execute".
- Close the status window by clicking on the OK button.
- For the query "Do you want to reset the unit", click on "No".

Save values and end adjustment

- In the "Available Functions:" window select "INIT OFF & STORE VALUES" and click on "Execute".
- Close the status window by clicking on the OK button.
- For the query "Do you want to reset the unit", click on "Yes".

Concluding tasks

Before ending the service program, save the new parameter values to disk (Service PC, Data menu, Backup).

Slot diaphragm

NOTE	**Use the lowest KV values possible to ensure optimal detection of the front edges of the slot diaphragm blades.**

Prerequisites

- The setting of the camera rotation is correctly adjusted and is in the 0° position.
- Mark the circle mask diameter in the upper left corner and lower right corner on the screen of monitor A.
- Connect the service PC to the serial interface of the SIREMOBIL.
- Start the service program.
- Select the "Adjustments, Calibrations..." menu. Answer the query with "Yes".
- Select "SCREEN DISPLAY SLOT DIAPHRAGM" in the "Function Groups:" combo box.

Disable circle mask

- Switch off zoom.
- In the "Available Functions:" window, select "DISABLE CIRCLE MASK" and click on "Execute". Close the status window by clicking on the OK button.
  For the query "Do you want to reset the Unit", click on "No".

Start adjustment

- In the "Available Functions:" window select "INIT" and click on "Execute". Close the status window by clicking on the OK button.
  For the query "Do you want to reset the Unit", click on "No".

Full format, slot diaphragm open

- Move the camera into the 0 degree position. The X-Iris opens to survey format. To open it farther, use the keys for opening the X-Iris.
  The slot diaphragm is opened automatically.

- Apply fluoro briefly.
- Open and close the slot diaphragm display via the keys.
- Align the lines shown on the monitor with the front edges of the slot diaphragm blades.

- In the window "Available Functions:" select "Slot Diaphragm Open Pos - I.I. Full Format" and click "Execute".
- Close the status window by clicking on the OK button.
- Respond to the query "Do you want to reset the unit" by clicking "No" .
  The slot diaphragm is closed automatically.

Full format, slot diaphragm closed

- Apply fluoro briefly.
- Open and close the slot diaphragm display via the keys.
- Align the lines shown on the monitor with the front edges of the slot diaphragm blades.
- In the window "Available Functions:" select "Slot Diaphragm Close Pos - I.I. Full Format" and click "Execute".
- Close the status window by clicking on the OK button.
- Respond to the query "Do you want to reset the unit" by clicking "No".
  The slot diaphragm remains closed.

Zoom format, slot diaphragm closed

- The zoom format is selected automatically.

- Apply fluoro briefly.
- Open and close the slot diaphragm display via the keys.
- Align the lines shown on the monitor with the front edges of the slot diaphragm blades.
- In the window "Available Functions:" select "Slot Diaphragm Close Pos - I.I. Zoom Format" and click "Execute".
- Close the status window by clicking on the OK button.
- Respond to the query "Do you want to reset the unit" by clicking "No". The slot diaphragm opens automatically (zoom format).

Zoom format, slot diaphragm opened

- Apply fluoro briefly.
- Open and close the slot diaphragm display via the keys.
- Align the lines shown on the monitor with the front edges of the slot diaphragm blades.
- In the window "Available Functions:" select "Slot Diaphragm Open Pos - I.I. Zoom Format" and click "Execute".
- Close the status window by clicking on the OK button.
- Respond to the query "Do you want to reset the unit" by clicking "No".

Enable circle mask

- In the "Available Functions:" window select "Enable Circle Mask" and click on "Execute".
  Close the status window by clicking on the OK button.
  For the query "Do you want to reset the unit", click on "No".

Save values and end adjustment

- In the "Available Functions:" window select "INIT OFF & STORE VALUES" and click on "Execute". Close the status window by clicking on the "OK" button.
  For the query "Do you want to reset the Unit", click on "Yes".

Concluding tasks

- Before exiting the service program, save the new parameter values to disk (Service PC, Data menu, Backup).

Correction of the 0° position of the slot diaphragm display

NOTE

Correct only if the slot diaphragms are shown at an angle of rotation different from that displayed on the monitor. A correction of ± 10° is possible. Camera rotation and slot diaphragm have to be set correctly.

The service PC is connected to the serial interface of the SIREMOBIL Iso-C.

The service program is started.

- Select the "Adjustments", "Parameter" menu at the service PC.
- Select "Screen display Slot diaphragm" in the Combo box.
- Click "Get from Unit".
- Select "Rotation 0 degree position".
- The parameter in the "Value Actual" field can be changed according to the minimum and maximum values.
- Then click "Set Value".
- Click "Put to Unit".
- After the SIREMOBIL Iso-C has booted, compare the 0° position of the slot diaphragm blades to the display on the monitor. If necessary, repeat the programming.
- Click "Save to file".
- Leave the service program with "Logoff" and "Quit" to save the parameters as a new file to disk.

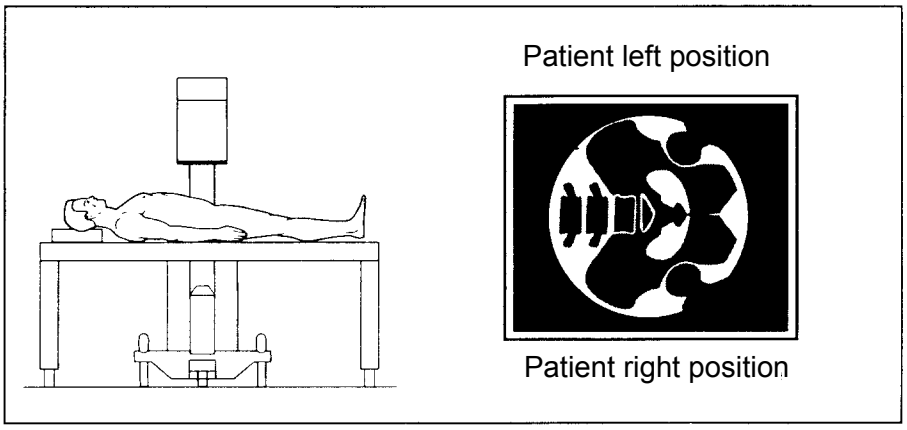


Fig. 3

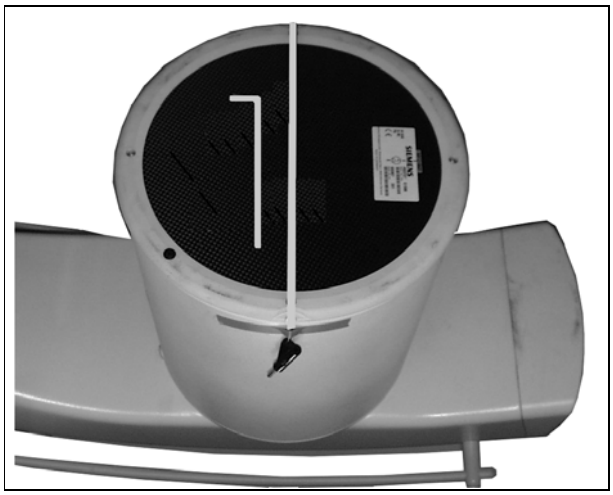


Fig. 4

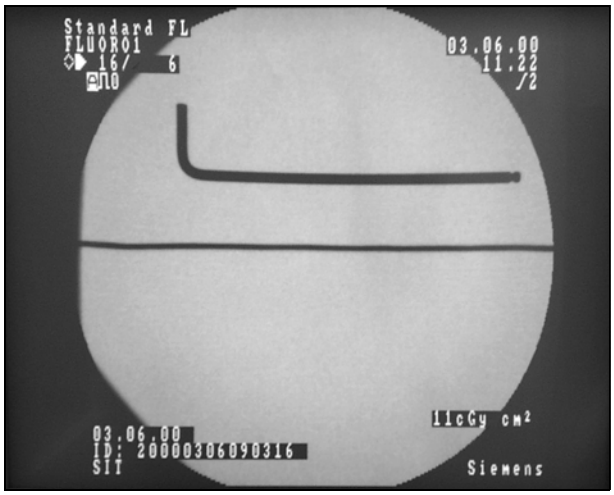


Fig. 5

Camera rotation

⚠WARNING

X-ray radiation!
See Chapter 1, Safety Information.

Observe the need for radiation protection. Wear a lead apron.

NOTE

The keys for horizontal and vertical image reversal must be off prior to adjusting camera rotation. Camera rotation should be set in the 0° position. Fig. 3, Fig. 4 and Fig. 5 shows the 0° position.

NOTE

With the right camera rotation key (the arrow on the key is pointing clockwise), the marker on the monitor will rotate clockwise. The image contents will rotate counterclockwise.

WIth the left camera rotation key (the arrow on the key is pointing counterclockwise), the marker superimposed on the monitor will rotate counterclockwise. The image contents will rotate clockwise.

- Connect the service PC to the serial interface of the SIREMOBIL Iso-C.
- Start the service program.
- Select the Adjustment, Calibrations menu.
- Answer the query "yes".
- In the Combo box "Function Groups:" select "Camera Rotation".
- In the window "Available Functions:" select "1. Init (Disable Limits)" and click on "Execute".
- For the query "Do you want to reset the Unit", click "No".
- Attach the center cross or equivalent to the image intensifier.

- Start fluoro and rotate the camera to the +180° position (With the camera rotation key clockwise). The image contents should rotate counterclockwise.
- Stop fluoro, in the window "Available Functions:" select "2. +180 Degree Position" and click on "Execute".
- For the query "Do you want to reset the Unit", click "No".

- Start fluoro and set camera rotation to the 0° position. The image (left/right / up/down) corresponds to Fig. 3.
- Stop fluoro, in the window "Available Functions:", select "3. 0 Degree Position" and click on "Execute" .
- For the query "Do you want to reset the Unit", click "No".

- Start fluoro and rotate the camera to the -180° position (with the counterclockwise camera rotation key). The image contents will rotate clockwise.
- Stop fluoro, in the window "Available Functions:", select "4. -180 Degree Position" and click on "Execute" .
- For the query "Do you want to reset the Unit", click "No".
- In the window "Available Functions:" , select "5. Init Off & Store Positions" and click on "Execute".
- For the query "Do you want to reset the Unit" , click "Yes".
- Return to the service program main menu with the ESC key.
- Select the Data, Backup... menu.
- Select Parameter in the Backup window.
- Click on "Backup".
- In "Remarks for Parameter" , enter "camera rotation set".
- Click "OK". The new position values for camera rotation will be stored to the disk.
- Switch the SIREMOBIL Iso-C OFF and ON again.
- Check the adjustments again. In the 0° position, the object image must correspond to the one in Fig. 3.

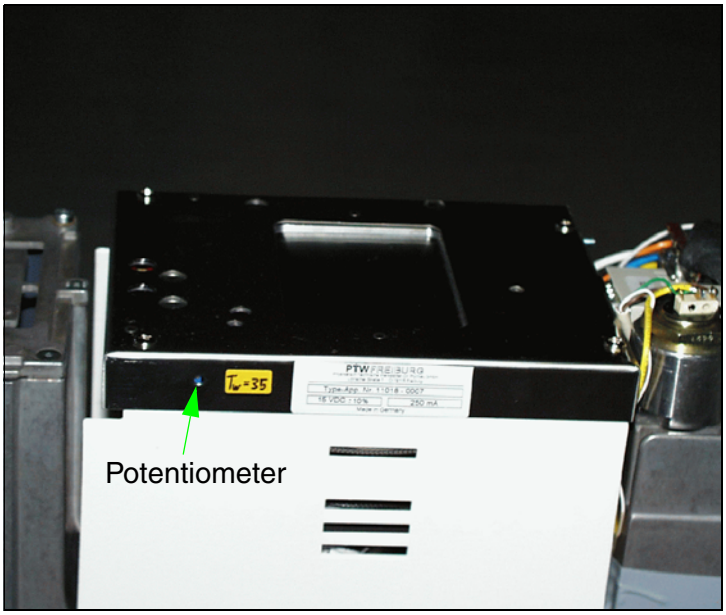


Fig. 6

Calibrating the area dose product measurement device

NOTE	**This adjustment is used to calibrate the area dose product measurement device of the SIREMOBIL Iso-C display.**

CONSTANT parameter (Qt * Kg) = T_w

- Read and record the T_w value shown on the electronics unit of the area dose product measurement device.

Programming

- Connect the service PC to the serial interface of the SIREMOBIL Iso-C.
- Start the service program.
- Select the Adjustment, Parameter menu.
- In the Combo box "Parameter Groups:", select "Diamentor" .
- Click on "Get from Unit".
- The Parameter "1. Diamentor Existing" must be on YES .
- Select parameter "2. Constant (Qt * Kg)" .
- In "Value Actual:"field, enter the parameterT_w.
- Click on "Set Value".
- Click on "Put to Unit" .
- Click on "Save to File".

NOTE	**You must exit the service program with "Logoff" and "Quit" to store the modified parameters to disk as a new file.**

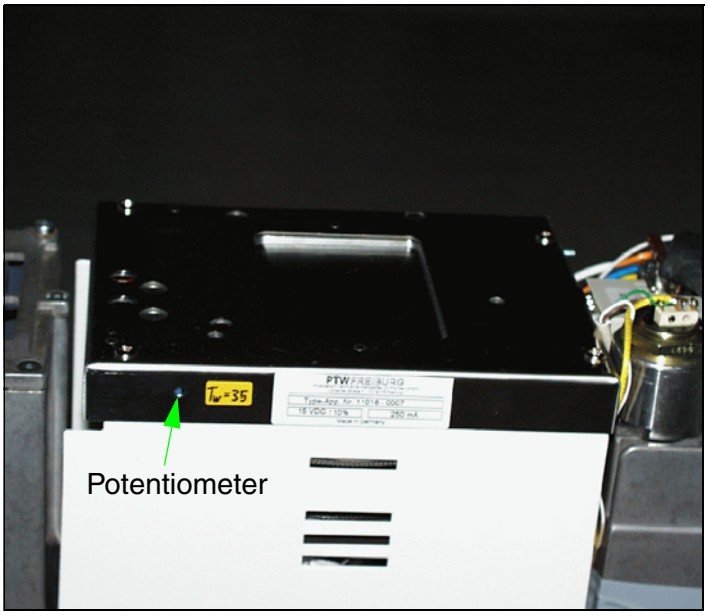


Fig. 7

Checking the programmed values

NOTE	**Checking the programmed values will activate the self-test in the electronic system of the area dose product measurement device. This serves to recalibrate the electronic system of the area dose measurement device.**

Prerequisites

The T_W value is already programmed. Refer to Programming.

- Connect the service PC to the serial interface of the SIREMOBIL Iso-C.
- Start the service program.
- Select the Adjustment, Calibrations menu.
- Click "Yes" to answer the query.
- In the Combo box "Function Group:", select "Diamentor".
- In the window "Available Functions" , select the line "Start Diamentor Test" and click on "Execute" .
- Close the status window by clicking on the Ok button.
- Respond to the query "Do you want to reset the unit" by clicking "No".
- Press the -0- key (reset key for fluoroscopic timer).
- The tested T_W value is displayed on the monitor of the SIREMOBIL Iso-C.
- This value must match the programmed CONSTANT (Qt*Kg) value. Tolerance: $\pm$ 5 %.
- By pressing the -0- key (reset key for fluoroscopic time) the test is repeated and is displayed again on the monitor.

- The potentiometer (Fig. 7) of the area dose product measurement device can be used to adjust the test value to the programmed value (Qt*Kg).
- After the adjustment, select "Stop Diamentor Test" on the service PC and click on "Execute".
- Close the status window by clicking on the Ok button.
- Respond to the query "Do ypu want to reset the unit" by clicking "No".
- The test is ended.
- Check the accuracy of the area dose product measurement device. Refer to the next page.

Checking the accuracy of the area dose product measurement device

Prerequisites

The calibration of the area dose product measurement device has already been performed.

Preparations

- Attach and center the center cross on the I.I. (Fig. 6).
- Select survey format.
- Select KV mA curve plateau HC1.
- Attach and center the small ($1cm^3$) dose measurement chamber of the dose measurement device (Dali, Nomex ...) onto the image intensifier (Fig. 7).

- Release fluoroscopy briefly, adjusting the iris on the radiation field to a format of approximately 8 cm.

NOTE **The radiation field must cover the entire area of the dose measurement chamber of the dose measurement device (Dali, Nomex ...) .**

- Do not make any further adjustments to the iris.
- Record the inner diameter (Fig. 8) of the octagonal area of the radiation field.
- Remove the center cross.
- The measuring chamber is still in the center of the I.I.
- Select kV STOP and enter 70 kV.

Dose measurement

- Press the >0< key twice to reset the area dose product on the SIREMOBIL monitor to 0 .
- Reset the dose measurement device (Dali, Nomex ...) to 0 .

- Release fluoroscopy for approx. 20 seconds (~ 3 mGy). The measured dose K_E should be high enough that the uppermost measurement range of the dose measurement device (Dali, Nomex...) is utilized fully; if necessary, reset the area dose product display on the SIREMOBIL and the dose measurement device and repeat the measurement with a different fluoroscopic time.
- Record the measured dose.
- Record the area dose product, displayed on the SIREMOBIL monitor (FDPa).

Calculating the area dose product

- To calculate the measured area dose product :
  (measured area dose product FDPg) = (measured dose K_E) * (inner diameter)^2 * 0.829.

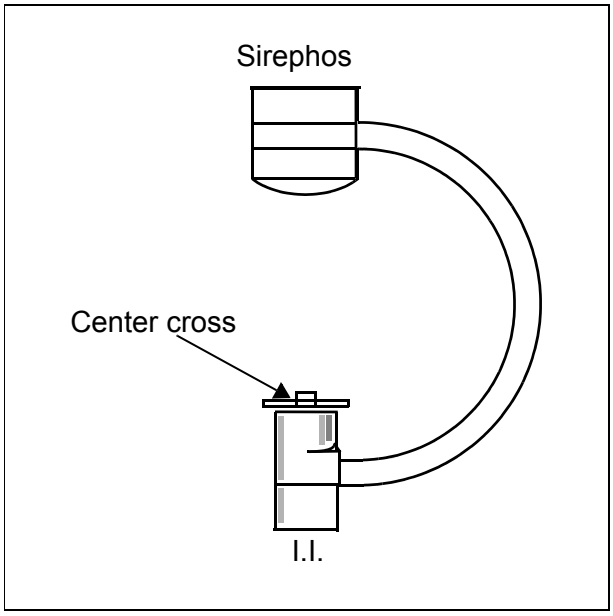


Fig. 8

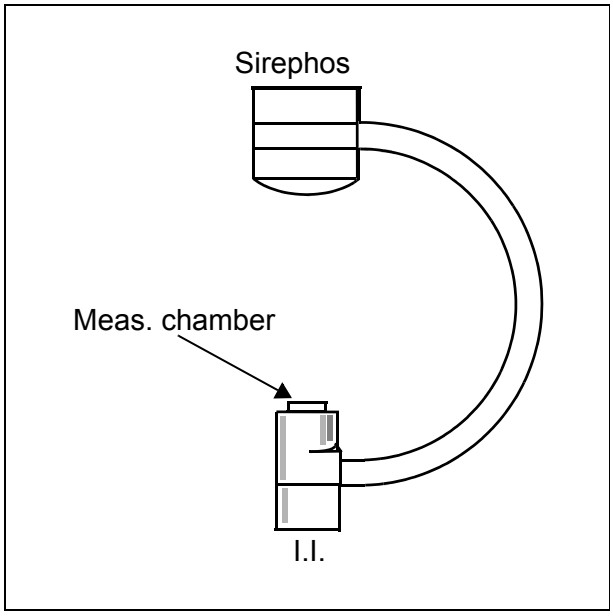


Fig. 9

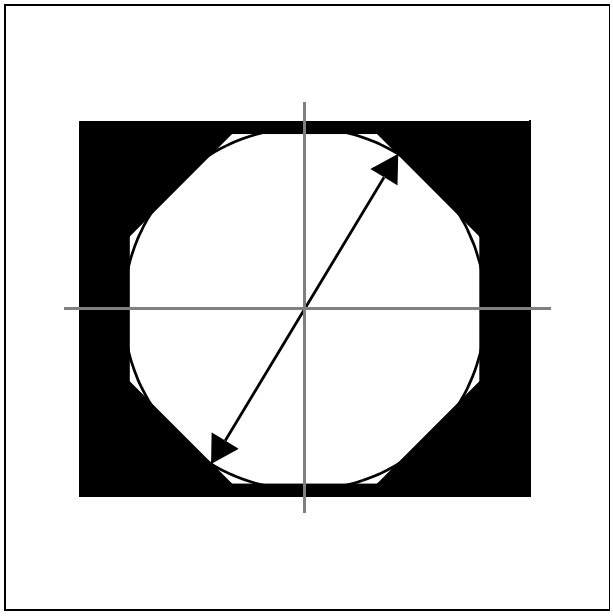


Fig. 10

Evaluation

Calculate the deviation between the measured area dose product and the displayed area-dose product:
The deviation must be < 0.3 .

Deviation = [(displayed area dose product FDPa) - (measured area dose product FDPg)] / (measured area dose product FDPg)

For deviations > 0.3, the area dose product measurement device must be replaced.

Overview of SIREMOBIL Iso-C Parameters

Invoke the Moreinfo.hlp help file on the service PC for a short description of the parameters available on the SIREMOBIL Iso-C.

NOTE

If parameters have been changed and saved in the "Adjustments, Parameter" menu with Save to file, you must exit the service program with "Logoff" and "Quit" to save the modified parameters to the disk.

Overview of MEMOSKOP C / C-E / C-SUB / C & MOD / C-SUB & MOD Parameters

User Setup

- The User Setup is invoked with the CTRL + U key combination.
- The available functions are described in the SIREMOBIL Iso-C Operating Instructions.

Technical Setup

- The technical setup is invoked with the CTRL + T key combination.
- Enter the password and confirm with [RETURN]

The following functions can be invoked depending on the type of MEMOSKOP:

Function:	Comments:
Test pattern generation	Not for service, invoke the necessary test images on the service PC.
Video frequency	The currently programmed frame rate is shown in the parentheses to the right. After downloading the MEMOSKOP or after replacement, the MEMOSKOP will start up at the default video frequency (50 Hz). If the monitors are configured for a different video frequency, you must perform "blind" configuration for the correct video frequency. Refer to Configuring video frequency.
Number of monitors	Allows you to program the number of monitors used (1 or 2)
Hardcopy setup	You can configure the connection for hardcopy cameras. Check whether 5000 is programmed for "4 Max Hardcopy time" and if not, program this value.
Edge 1 coef set	Allows configuration of edge enhancement. Check whether 3 is programmed and if not, program this value.
Edge 2 coef set	Allows Configuration of edge enhancement. Check whether 8 is programmed and if not, program this value.
Motion detection setup	Configures the motion detector. Check if at MD 1: Threshold 100 and at MD 2:Threshold 120 is programmed, if not, program these values.
Circular mask setup	Allows you to configure the diameter of the circular mask.

Function:	Comments:
Move text positions	Allows you to configure the position of superimposed text.
Date / Time format	European: TT MM JJ / HH MM US: MM DD YY / HH MM
System configuration	Allows you to read out the current MEMOSKOP configuration.
Keyboard	Allows you to program the corresponding keyboard layout Universal / Roman.
Graphics level	Level (brightness) of superimposed text. (Default: 128)
Display of real time clock	Yes: Real time clock (date and time) are displayed depending on the User setup programming for MEMOSKOP. The real time clock is active. NO: The real time clock is switched off. The User setup programming will not affect it.
Display of rotated images	Yes: When pressing the image rotation key, the current image will be computerized and displayed. NO: The rotated image will not be computerized when pressing the image rotation key. For SIREMOBIL Iso-C always set to YES.
Product name	Allows you to change the MEMOSKOP name, displayed during system booting. Enter SIREMOBIL Iso-C.
Diagnostics	Allows you to invoke test routines for repair by the manufacturer of the MEMOSKOP. The MEMOSKOP can be reset via "Load factory default", as required. Subsequently you have to program accordingly. The same applies if you replace the MEMOSKOP
Create External Disk (1)	MEMOSKOP CE and MEMOSKOP CE-100: Program the value to "No". All other types of MEMOSKOP: If a MOD drive is implemented and/or the option "3D Reconstruction" is installed and/ or the option DICOM Bridge. Is installed, program the value to "Yes".
Enable Bridge (1)	MEMOSKOP CE and MEMOSKOP CE-100: Program the value to "No". All other types of MEMOSKOP: If a MOD drive is implemented and/or the option "3D Reconstruction" is installed and/or the option DICOM Bridge. Is installed, program the value to "Yes".
Delay 3D-PC/ DICOM Bridge (1)	Only available if option "3D Reconstruction" is installed. Configure 120.
Interface to 3D-PC	Only available if option "3D Reconstruction" is installed. Configure Yes.

Function:	Comments:
Monitor zoom	Yes: When pressing the key for MEMOSKOP - Zoom, the image will be displayed enlarged. NO: The MEMOSKOP - Zoom key has no function. For MEMOSKOP C-E set on NO. Otherwise set YES.
Monitor split	Yes: Horizontal or vertical image split possible. No: No horizontal or vertical image split possible. Program Yes.
Monitor text	Yes: Superimposes text. No: No text superimposition. For SIREMOBIL Iso-C always set on Yes.
Maximum no. of images	The number of stored images can be progemmed. Program the value to 700 for MEMOSKOP C and to 900 for MEMOSKOP SUB. For MEMOSKOP C-E 100 program the value to 100 For MEMOSKOP C-E, this parameter is not used.
Default programs changeable	Default: Yes The organ programs can be protected against changes by setting "No".
Default LUT	After switch-on, the programmed brightness/contrast curve (LUT) is selected automatically: Default: LUT 2
Default LUT for Subtraction	After switch-on, the programmed brightness/contrast surve (LUT) is selected automatically for the subtraction mode, when equipped with a MEMOSKOP C-Sub. Default: LUT 1
Default Edge	After switch-on, the programmed edge enhancement is selected automatically: For MEMOSKOP SUB set on 1.
Software compatibility	Not implemented. Must be set to "No".
Unit serial number	Enter the serial number of the SIREMOBIL Iso-C when it is equipped with a DICOM bridge. The serial number is required to identify the images transferred. Please note that you have to omit the leading 0 when entering the serial number.
Disable dose rate selection in user Setup	This means "Yes" for SIREMOBIL Iso-C without an area dose product measurement device. This means "No" for a SIREMOBIL Iso-C with an area dose product measurement device.
Subtraction K-factor, phase A	Noise suppression, phase A, is programmed in the SUB-mode. Phase A: Mask acquisition.
Subtraction K-factor, phase B	Noise suppression, phase B, is programmed in the SUB-mode. Phase B: Acquisition of fill image.
Subtraction Time of phase A	The time of phase A in the SUB-mode is programmed. Phase A: Mask acquisition.
Roadmap K-factor, phase A	Noise suppression, phase A, is programmed in the roadmap mode. Phase A: Mask acquisition.

Function:	Comments:
Roadmap K-factor, phase B	Noise suppression, phase B, is programmed in the roadmap mode. Phase B: Acquisition of fill images.
Roadmap K-factor, phase C	Noise suppression, phase C, is programmed in the roadmap mode. Phase C: Acquisition of roadmap images.
Roadmap Time of phase A	The time of phase A in the roadmap mode is programmed. Phase A: Mask acquisition.

(1) in menu Diagnostics

Configuring the MEMOSKOP

MEMOSKOP C-E, keyboard emulation

There is no keyboard supplied with some SIREMOBIL Iso-C units and installed MEMOSKOP C-E.
When replacing the MEMOSKOP C-E or when changing the configuration, the MEMOSKOP service program should be used.

The help file "C-DATA.hlp" will be copied to the service PC during installation of the MEMOSKOP service program. The "C-DATA.hlp" help file contains descriptions of the programming.

Configuring the video frequency

After replacing the MEMOSKOP, it will start at a default video frequency (50 Hz). If the monitors were configured for a different frequency, you will have to configure the MEMOSKOP.

Without installed MEMOSKOP keyboard:

- Use the MEMOSKOP service program to modify the configuration.

With installed MEMOSKOP keyboard:

- Invoke Technical Setup on MEMOSKOP (press the CTRL + T keys).
- Press the "2" key and press return. The video frequency menu is selected.
- Depending on the required video frequency, press the right cursor key "->".

"->" pressed 1 time: 60 Hz video frequency
"->" pressed 2 times: 100 Hz video frequency
"->" pressed 3 times: 120 Hz video frequency
"->" pressed 4 times: 50 Hz video frequency

"->" = Press the right cursor key

Key "->":	(Start	"->"	"->"	"->"	"->"	...
Video frequency	50 Hz	60 Hz	100 Hz	120 Hz	50 Hz	etc...
Key "<-":	"<-"	"<-"	"<-"	"<-"	"<-"	"<-"

"<-" = Press the left cursor key

After selecting the desired video frequency, press "Return". This configures the video frequency you have just selected. After switching the SIREMOBIL OFF and ON again, the MEMOSKOP will start up at the correct video frequency.

MEMOSKOP, configuration for the number of existing monitors

When you replace the MEMOSKOP, it will be configured for 2 monitors. This configuration displays USER SETUP and TECHNICAL SETUP on the second monitor.
Therefore, USER SETUP and TECHNICAL SETUP are not visible for SIREMOBIL Iso-C systems with only one monitor.

Without installed MEMOSKOP keyboard:

- Use the MEMOSKOP service program to modify the configuration.

With installed MEMOSKOP keyboard:

- On the MEMOSKOP, reconnect the video cable from OUT 1 to OUT 2.
- Press CTRL + T at the same time on the MEMOSKOP keyboard; TECHNICAL SETUP is called up and is now visible on the monitor.
- Call up the menu "Number of monitors" by pressing the "3" key and subsequently the "RETURN" key on the MEMOSKOP keyboard.
- With the -> and <- cursor keys, set the number to 1 monitor and press the "RETURN" key. The text display disappears on the monitor.
- Press the "RETURN" key once more.
- Reconnect the monitor to the OUT 1 video output. The text display is now visible on the monitor.
- Exit TECHNICAL SETUP by pressing the "HOME" key on the MEMOSKOP keyboard.

MEMOSKOP, configuration and country-specific language (User Setup)

Start the MEMOSKOP service program and transfer the country-specific language to SIREMOBIL Iso-C via the service PC.

NOTE	**After completing the MEMOSKOP configuration, save the parameters on a diskette. Exit the service program and switch the SIREMOBIL off and back on again.**

Control board D1

⚠WARNING

Electrical voltage!
See Chapter 1, Safety Information.

Make sure that LED V400 on board D2 is off prior to performing any work on boards D1 and D2. This should occur approximately 3 minutes after switching the SIREMOBIL Iso-C OFF.

Replacement and additional work

- Disconnect board D1 completely.
- Replace board D1.
- Reconnect all cable connections.
- Be sure that the shielding and ground connections are seated correctly.
- Set the jumpers and switches according to the circuit diagram.
- Perform the Download procedure for control board D1 (Host/Arc/Fill).

NOTE

For SIREMOBIL Iso-C 3D perform the download with the software, delivered with the unit or 3D upgrade kit (see Logbook).

NOTE

In case the EE-PROM of the replacement D1 has not been completely erased, it will be automatically erased after the host software has been downloaded.
The delete procedure is indicated as "d" on the 7 segment display and requires approximately 5 minutes.
During the delete procedure, do not switch off the system or perform additional programming.
After successful deletion, the 7 segment display will return to normal status display.

- After Download, wait 1 minute until the system has rebooted.
- Load the system parameters onto board D1.
  (Select DATA menu, RESTORE Parameter and click Restore.)
- Perform the kV offset adjustment.
- Perform the generator adjustment (filament circuit learning program).
- Check the dose rate control and, if necessary, adjust it.
- Ensure that the camera rotation is functioning properly. Adjust, if necessary.
- Ensure that the collimator is functioning properly. Adjust, if necessary.
- Check the display functions and setting of the blades on the monitor. Adjust, if necessary.
- Ensure that the area dose product measurement device (where present) is functioning correctly.
- Ensure that the laser targeting device (where present) is functioning properly .
- Test the FL / PFL / DR and direct exposure functions of the SIREMOBIL Iso-C.

Power board D2

⚠WARNING

Electrical voltage!
See Chapter 1, Safety Information.

Make sure that LED V400 is off prior to performing any work on boards D1 and D2. This should occur approximately 3 minutes after switching the SIREMOBIL Compact OFF.

- Disconnect boards D1 and D2 completely.
- Disconnect the cables between boards D1 and D2.
- Remove board D1 and D2.
- Apply heat conducting paste to the heat sink for the power semiconductor on the new D2 board.
- Reinstall board D2 and D1 and reattach all connections.
- Ensure that the shielding and ground connections are positioned correctly.
- Perform the kV offset adjustment and the generator adjustment (filament learning).
- Test the FL / PFL / DR and direct exposure functions, if there is a cassette holder .

Interface board D30

- Replace interface board D30.
- Check the +27 V /+24 V /+24 V voltage. Adjust it , if necessary. Refer to chapter 3 of these instructions, Checking the operating voltages.
- Check the radiation release / format switch over / vertical column travel / brakes functions.

Fig. 1

Replacing the VIDEOMED DC

⚠WARNING	**Risk of injuries on mechanical parts!** **If not observed, slight to medium injuries, especially to the hands, can occur.** **Observe the notes concerning the C-arm carbon fiber structure.**
NOTE	**When removing or installing the VIDEOMED DC, make sure that there are no dust or dirt particles on the optics.**

- Move the I.I. into the service position. Refer to chapter 1.
- Remove the cable ties at the VIDEOMED DC board. Refer to the arrow /Fig. 1).
- Remove the connection between the VIDEOMED DC and the Compact optics.
- Unlock the plug for the cable spool and pull it out.
- Remove the locking screw for the VIDEOMED DC.
- Remove the VIDEOMED DC.

Camera rotation 0° position

- Connect an ohmmeter to the actual value potentiometer of the Compact optics at points 2 and 3.
- Turn the Compact optics by the clamping ring (slowly), until the ohmmeter displays 5000 ohms $\pm$ 40 ohms (0° Position). Do not adjust the camera rotation any further.
- Install the new Videomed DC at the 0° position and tighten the clamp. The center of the plug is in the 0° position, exactly centered to the I.I. housing. Refer to Fig. 1.
- Reconnect the plug for the cable spool.

- Reconnect the plugs between the VIDEOMED DC and the Compact optics and secure them with cable ties. In doing this, make sure that the cable or the cable ties do not extend beyond the edge of the board and that they are located in the recess of the VIDEOMED DC board.
- Leave the I.I. in the service position.

Checks and adjustments

- Switch the system on and rotate the camera from +220 degrees to -220 degrees. When doing this, the cable in the cable spool must allow for unhindered rotation over the entire rotation range.
- Check the camera rotation and, if necessary, readjust it. The camera should be able to rotate 220° +3° or -220° -3° (Check this using the display).
- Check the dose rate and, if necessary, readjust it.
- Perform the IQ Quick test. First check the resolution. If necessary, adjust the optical sharpness at the Compact optics.
- If the "Modularis" system is present, perform the isocenter check.

Basic system operating panel

- Disconnect the plugs for the operating panel from board D1.
- Remove the cable clamps to the operating panel.
- Remove the Allen screws on the mounting ring (swivel joint of the operating panel).
- Replace the operating panel .
- Reinstall the mounting ring.
- Reconnect the cable.
- Reattach the cable clamp.
- Perform a function test of the operating panel.

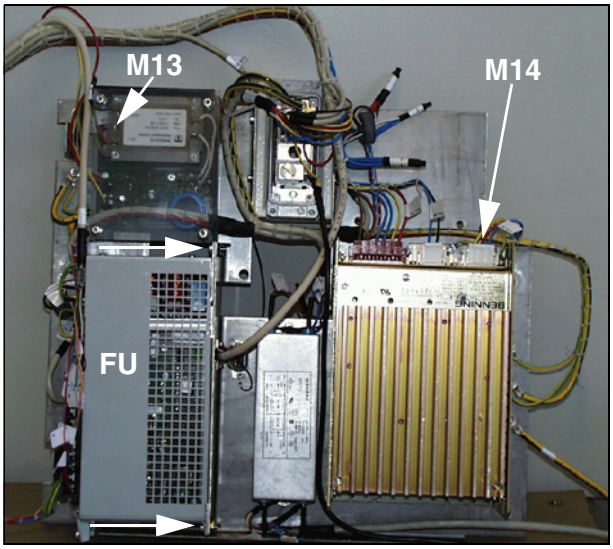


Fig. 2

Frequency converter FU (Vertical lift)

⚠WARNING

Electrical voltage!
See Chapter 1, Safety Information.

Switch system power supply off and disconnect the power plug.

- Remove the Plexiglas cover over the plug field/clamp field of the frequency converter.
- Disconnect the power plug.
- Remove the cable clamps and cable ties at and in front of the frequency converter.
- Disconnect all the cables at the frequency converter after you have documented this.
- Replace the frequency converter after removing the Allen screws.
  (Refer to arrows, Fig. 2.)

NOTE

Prior to installing the new frequency converter, remove the bridge on X5 between PTC and -Uzk.

- Reconnect all the cables.
- Reconnect the power plug.
- Secure the cables with cable ties.
- Reattach the cables with the cable clamps.
- Perform a function test of the column vertical lift.

Power Supply M14, +5 V / +15 V / -15 V

⚠WARNING

Electrical voltage!
See Chapter 1, Safety Information.

Switch system power supply off and disconnect the power plug.

- Replace the power supply.
- Check the power supply voltage and, if necessary, adjust it. Refer to chapter 3 of these instructions, Checking the operating voltages.

Power Supply M13, +13 V VIDEOMED DC

⚠WARNING

Electrical voltage!
See Chapter 1, Safety Information.

Switch system power supply off and disconnect the power plug.

- Remove the Plexiglas cover over the power supply. Remove the 4 Allen screws.
- Replace the power supply.
- Check the power supply voltage and , if necessary, adjust it. Refer to chapter 3 of these instructions, Checking the operating voltages.

I.I. Mini Voltage Supply

⚠WARNING

Electrical voltage!
See Chapter 1, Safety Information.

Prior to removing the mini voltage supply, the system must be switched off for at least > 3 minutes, until the high voltage in the system and in the I.I. mini voltage supply dissipates.

⚠WARNING

Risk of injuries on mechanical parts!
If not observed, slight to medium injuries, especially to the hands, can occur.

Observe the notes concerning the C-arm carbon fiber structure.

⚠CAUTION

Risk of injury!
Noncompliance can lead to light to medium injuries and/or property damage.

The C-arm covers contain counterbalance weights and weigh approx. 6 kg.
Hold the covers firmly when installing or removing them.

Before the C-arm cover will be loosened, the C-arm must be moved to its middle orbital position.
If the C-arm covers are loosened, the C-arm may not be moved to its orbital end positions (I.I. or SIREPHOS at the orbital end position).

NOTE

Rotate the camera into the 0° position prior to beginning work to avoid having to readjust the camera rotation.

NOTE

The cathode wire on the image intensifier (black wire connected to plug CON1.8 on the controller) is fairly short in some locations.

The cathode wire can be extended for easier access to the measuring points and potentiometer on the controller. To extend the wire, split the wire and strip off the insulation from the wire ends.

Place two pieces of appropriately sized shrink tubing over the wire ends.
Solder an approximately 25 cm wire to 0.75 square mm.
Insulate the wire ends with the shrink tubing.

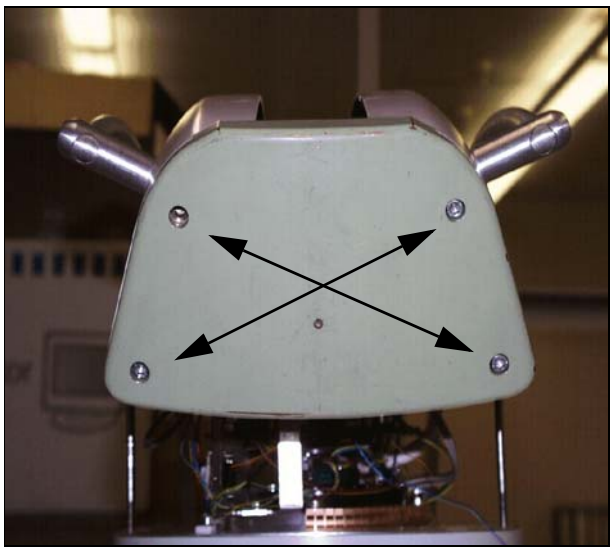


Fig. 3

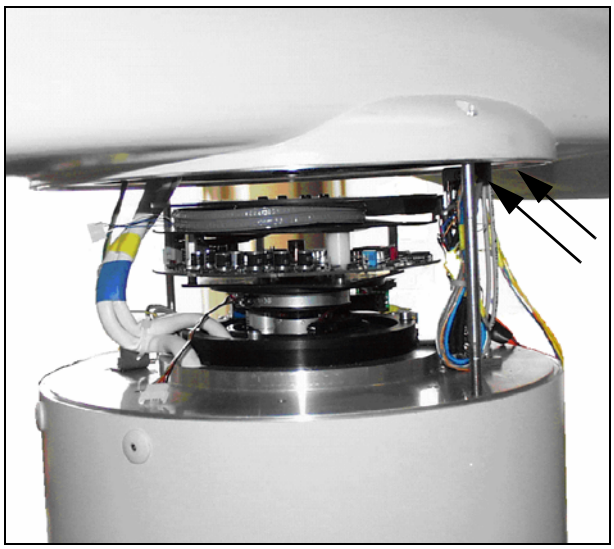


Fig. 4

- Remove the cover on the front side of the C-arm by removing the screws (I.I. side, refer to Fig. 3).
- Move the I.I. into the service position. Refer to chapter 1, I.I. service position.
- Remove both attachment screws for the control section in the I.I. flange of the C-arm (arrow/Fig. 4).
- Carefully remove the control section from the C-arm and disconnect all the plugs.
- Disconnect the protective conductor.
- Remove the VIDEOMED DC camera from the I.I.
- Refer to Replacing boards / Replacing components VIDEOMED DC.

Fig. 5

- Remove both attachment screws for the high voltage section from the I.I. flange of the C-arm (Fig. 5).
- Remove the high voltage section from the C-arm.
- Disconnect all the plugs. Dissipate any residual voltage in the cables by shorting them to ground.
- Install the new high voltage section.
- Connect the control section, securing it with the screws only after you have adjusted it. Refer to: Adjusting the I.I. mini voltage supply.
- Remount the VIDEOMED DC and tighten the clamp.

Adjusting the I.I. mini voltage supply

⚠CAUTION

Risk of injury!
Noncompliance can lead to light to medium injuries and/or property damage.

The C-arm covers contain counterbalance weights and weigh approximately 6 kg (13lbs).

Before the C-arm cover will be loosened, the C-arm must be moved to its middle orbital position.
If the C-arm covers are loosened, the C-arm may not be moved to its obital end positions (I.I. or SIREPHOS at the orbital end position).

- Hold the covers firmly when removing or installing them.
- Remove the cover from the front side of the C-arm by removing the screws (I.I. side).
- Move the I.I. into the service position (Refer to the section: I.I. service position).
- Remove both attachment screws for the control section on the I.I. flange.
- Carefully remove the control section from the C-arm.
- Adjust the anode voltages E1 (measuring point UE1), E2 (measuring point UE2), E3 (measuring point UI15) and Anode (measuring point UI30) according to the I.I. protocol. Refer to the circuit diagram.
- Reinstall the control section in the C-arm.
- Reinstall the C-arm cover.
- Perform the IQ Quick test.
- Check the function and setting of the collimator and, if necessary, adjust it.

- Check the function and setting of the collimator display on the monitor and, if necessary, adjust it.
- Check the 0° position of the camera rotation.
  Refer to the chapter "Replacing the VIDEOMED DC, 0° Position".
- Check the camera rotation function.
- Reinstall the I.I. on the C-arm. Refer to chapter 1, I.I. service position.

Collimator

- Replace the collimator.
- Ensure that the collimator is functioning properly and is set correctly.
  If necessary, adjust it.

- Ensure that the collimator blades of the iris diaphragm are visible during fluoroscopy in survey format and zoom format on at least 2 sides of the monitor image.
- Check the collimation for direct exposure if a cassette holder is being used.
- Check the display of the blades on the monitor and adjust, if necessary.

- Remove the old set of collimator labels near the SIREPHOS and attach the new labels included in the same position.
  Check that the original collimator labels are the same as the new ones.
- If the "MODULARIS" system is present, perform the isocenter check.

SIREPHOS

⚠WARNING

Risk of injuries on mechanical parts!
If not observed, slight to medium injuries, especially to the hands, can occur.

Observe the notes concerning the C-arm carbon fiber structure.

- Remove the laser targeting device, if present.
- Remove the dose measurement chamber, if present.
- Remove the collimator.
- Disconnect the SIREPHOS plug.
- Remove the ground screw for the protective conductor.
- Remove the rubber stop of the C-arm on the SIREPHOS side. The screws that secure the SIREPHOS are now visible.
- Remove the SIREPHOS screws. When doing this, have a second person hold the X-ray tube unit.
- Place the new X-ray tube unit on the guide bolts and secure it with both Allen screws.
- Ensure that all cables are routed properly.
- Reconnect the SIREPHOS plug and secure it.
- Reconnect the protective conductor using the ground screw.
- Do not install the rubber stop yet.
- Reinstall the collimator and connect it.
- Reinstall the dose measurement chamber / laser targeting device and connect them.

⚠WARNING

X-ray radiation!
See Chapter 1, Safety Information.

Use radiation protection! Wear a lead apron.

- Perform the kV offset adjustment.
- Perform the generator adjustment (filament circuit learning program).
- Ensure that the collimator is functioning properly and is set correctly.
- Ensure that the collimator blades are centered in the blanking circle.
  - If possible, slightly loosen the SIREPHOS screws and tilt the SIREPHOS to adjust it.
  - Retighten the SIREPHOS screws.
- Ensure that the collimator blades of the iris diaphragm are visible during fluoroscopy in the survey format and zoom format on at least 2 sides of the monitor image.

- Check the display of the blades on the monitor screen and adjust, if necessary.
- Check collimation for direct exposure if there is a cassette holder.
- Reinstall the rubber stop.
- Ensure that the area/dose product measurement device is functioning properly (if present).
- Check the setting of the laser targeting device and, if necessary, adjust it according to the Adjustment Instructions for the Laser Targeting Device, RXR2-130.032.01.
- If the "MODULARIS" system is present, perform the isocenter check.

Replacing the I.I.

Checking the temperature indicator

- Prior to installing the I.I., check the temperature indicator.
- If the inner square field of the indicator is white, the I.I. did not exceed the temperature range. Remove the temperature indicator.
- If the indicator is discolored (inner field black), proceed according to the IQ document RXD-000.038.01.

⚠WARNING

Electrical voltage!
See Chapter 1, Safety Information.

Switch the SIREMOBIL Iso-C off and wait at least > 3 minutes until the high voltage in the system and in the I.I. mini voltage supply dissipates.

Removal

⚠WARNING	**Risk of injuries on mechanical parts!** **If not observed, slight to medium injuries, especially to the hands, can occur.** **Observe the notes concerning the C-arm carbon fiber structure.**

⚠CAUTION	**Risk of injury!** **Noncompliance can lead to light to medium injuries and/or property damage.** **The C-arm covers contain counterbalance weights and weigh approx. 6 kg.** **Hold the covers firmly when installing or removing them.** **Before the C-arm cover will be loosened, the C-arm must be moved to its middle orbital position.** **If the C-arm covers are loosened, the C-arm may not be moved to its orbital end positions (I.I. or SIREPHOS at the orbital end position).**

VIDEOMED DC

- Move the I.I. into the service position. Refer to chapter 1, I.I. service position.
- Remove the Videomed DC and place it on a clean surface.
- Cover it to prevent contamination. Refer also to chapter 6, VIDEOMED DC.

I.I. mini voltage supply

- Remove the I.I. mini voltage supply and lay it down on a suitable surface (Control section and high voltage section).
- Refer to chapter 6, Replacing the I.I. mini voltage supply.
- Dissipate any residual voltage in the cables by shorting them to ground.
- Remove the O-ring and the cap nut from the anode cable.
- Remove the plug for the cassette contact.
- Disconnect all the cables (protective conductor, cable to VIDEOMED DC, etc.....) from the I.I.
- At the same time, remove the cable ties or the cable clamps.
- Pull all the cables inside the C-arm.

I.I. and Compact optics

NOTE

When removing the Compact optics, make sure that no dust or dirt particles contaminate the I.I. output window.

Do not loosen the eccentric screws (2/Fig. 7) on the edge of the Compact optics!

These are used to center the Compact optics to the I.I. output screen.

- Firmly grasping the I.I., swivel the C-arm so that the I.I. is below and the SIREPHOS is above.
- Place the I.I. carefully on the C-arm flange.
- Remove both threaded pins from the I.I. housing.
- Lift the I.I. toward the top off the C-arm, turn it around and place it on a suitable surface. (I.I. is standing on the grid.)
- Remove the retainer clip for attaching the plugs and cable guide from the I.I.
- Remove the Compact optics and place them on a dust-free surface.
- Reattach the Compact optics and the retainer to the new I.I.
- If the "MODULARIS" system or a laser light localizer are present, remove the centering disk attached above the grid.
- Remove the grid. Desolder the wires for the cassette contact.

Installation

Compact optics

NOTE

When installing the Compact optics and the VIDEOMED DC, make sure that no dust or dirt particles contaminate the I.I. output window or the Compact optics.

- Reattach the Compact optics to the new I.I.
- When doing this, thread the anode wire through the recess in the optics.
- The camera optics must lie against the eccentric screws.
- Reinstall the O-ring and the cap nut for the anode cable.
- The cable length should be 70 mm from the beginning of the white wire to the cap nut.
- Reattach the retainer clip for attaching the plug and the cable guide to the I.I.

I.I.

- Mount the I.I. back on the C-arm flange. The labels should face the C-arm.
- Reinstall the attachment screws in the threaded holes. Turn them at least 5 revolutions.
- Holding the I.I. firmly, swivel the C-arm so that the I.I. is above and the SIREPHOS is below.
- Carefully lower the I.I. into the service position.

I.I. Mini voltage supply

- Reinstall the high voltage section of the I.I. mini voltage supply.
- Reconnect the control section, however, do not tighten the screws yet.
- Route the cables to the high voltage section and the control section and secure them with cable ties or cable clamps.

VIDEOMED DC

- Rotate the Compact optics into the 0° position (slowly!).
- Connect an ohmmeter to the potentiometer for camera rotation, point 2 and 3. At 0° , there should be a resistance value of 5000 ohms, $\pm$ 40 ohms.
- Place the VIDEOMED DC in the 0° position on the compact optics and secure it with the clamp. Refer also to chapter 6, Replacing the VIDEOMED DC.

Miscellaneous parts

- Mount the grid to the new I.I. Attach the wires for the cassette contact.
- Reroute and reconnect all the cables (protective conductor, cables etc....).

Checks and adjustments

- Check the I.I. electrode voltages according to the test protocol for the I.I. and adjust them.
- Check the resolution. If necessary, adjust the optical sharpness on the Compact optics.
- When doing this, use the I.Q. Quick test, chapter: Resolution for evaluating the optical sharpness.
- Check the dose rate and, if necessary, adjust it.
- Check that the camera optics are centered to the I.I. output and, if necessary, adjust them. Refer also to chapter 6: Replacing the Compact optics, paragraph "Checking the camera optics centering at the I.I. output" and "Centering the Compact optics to the I.I. output".
- Check the camera rotation and, if necessary, adjust it.

Concluding work

- Reinstall the I.I. on the C-arm flange. Refer to chapter 1, I.I. service position.
- Check the collimator display on the monitor and, if necessary, adjust it.
- Perform the I.Q. Quick test.
- Check the setting of the laser light localizer, if present. If necessary, adjust it.
- If the "MODULARIS" system is present, perform the isocenter check.
- Execute the country-specific acceptances (§16 Partial acceptance test, DHHS,...).

Fig. 6

Replacing the Compact optics

⚠WARNING

Electrical voltage!
See Chapter 1, Safety Information.

Switch the SIREMOBIL Compact off and wait approximately 3 minutes for the voltage in the I.I. mini voltage supply to drop.

Removal

⚠WARNING

Risk of injuries on mechanical parts!
If not observed, slight to medium injuries, especially to the hands, can occur.

Observe the notes concerning the C-arm carbon fiber structure.

⚠CAUTION

Risk of injury!
Noncompliance can lead to light to medium injuries and/or property damage.

The C-arm covers contain counterbalance weights and weigh approx. 6 kg.
Hold the covers firmly when installing or removing them.

Before the C-arm cover will be loosened, the C-arm must be moved to its middle orbital position.
If the C-arm covers are loosened, the C-arm may not be moved to its orbital end positions (I.I. or SIREPHOS at the orbital end position).

Camera optics

- Move the I.I. into the service position. Refer to chapter 1, I.I. service position.
- Rotate the camera into the 0° position. Refer to Fig. 6.

VIDEOMED DC

- Cut off the cable ties (refer to the arrow, Fig. 6) and disconnect the plugs.
- Remove plug X1 at the Compact optics.
- Remove the VIDEOMED DC and place it on a clean surface. Refer to: Replacing the VIDEOMED DC.

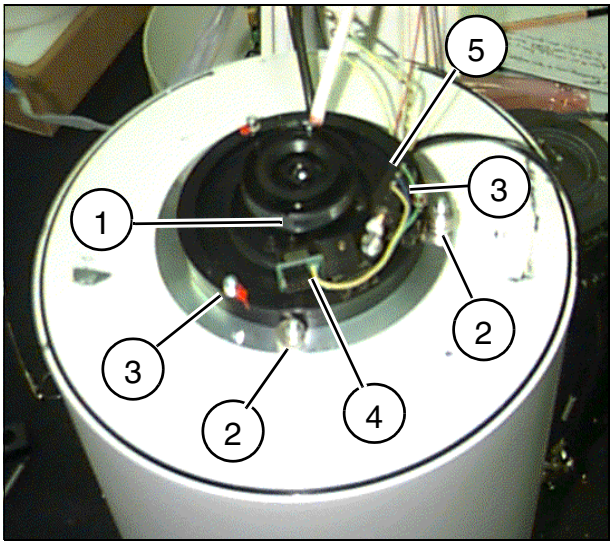


Fig. 7

High voltage section of the I.I. mini voltage supply

- Remove the high voltage section of the I.I. mini voltage supply. Remove both attachment screws at the C-arm flange. Refer to the arrows, Fig. 6.
- Disconnect the anode cable from the high voltage section.
- Remove the O-ring and the cap nut from the cable.

Compact optics

NOTE	**When removing the Compact optics, make sure that no dust or dirt particles contaminate the I.I. output.** **Do not loosen the eccentric screws (2/Fig. 7) on the edge of the Compact optics! These screws are used to center the Compact optics to the I.I. output.**

- Remove the attachment screws of the Compact optics. If necessary, remove the retainer clip for the plug / cable leads as well.
- Remove the Compact optics.

Installation

NOTE	**When installing the Compact optics, make sure that no dust or dirt particles contaminate the I.I. output or the Compact optics.**

Optics

- Reinsert the rubber gasket between the Compact optics and the I.I. housing.
- Install the new Compact optics. Reattach the retainer clip for the plug / cable routing.
- Route the anode cable through the recess in the Compact optics.
- The Compact optics must lie against the eccentric screws.

High voltage section

- Reinstall the O-ring and the cap nut on the anode cable. The cable length from the beginning of the white wire to the cap nut should be 70 mm.
- Reconnect the high voltage cable.
- Reinstall the high voltage section.
- Reattach the cables for the high voltage section with cable ties.

Camera rotation 0° position

- Rotate the Compact optics into the 0° position.
- Connect an ohmmeter to the potentiometer for camera rotation, point 2 and 3.
- In the 0° position, the resistance must be 5000 ohms $\pm$ 40 ohms.
- If necessary, grasp the Compact optics by the clamping ring for the VIDEOMED DC and slowly rotate them.

VIDEOMED DC

- Place the VIDEOMED DC in the 0° position on the Compact optics and tighten the clamp. Refer also to Fig. 6.
- Reinstall the connection cable (refer to arrow, Fig.6) and reattach the cable with a cable tie in the recess of the VIDEOMED DC board. When doing this, make sure that the cable tie and the cable do not extend beyond the edge of the board.
- Reconnect plug X1 of the VIDEOMED DC cable spool.

Miscellaneous cables

- Reconnect all cables and plugs (protective conductor, cassette contact, etc....) and secure them with cable ties.

Settings

Resolution

- The I.I. should remain in the service position

⚠WARNING

X-ray radiation!
See Chapter 1, Safety Information.

Use radiation protection! Wear a lead apron.

- Attach the resolution test to the I.I. input.
- Insert 2.1 mmCu + 60 mm Al at the radiation exit port of the SIREPHOS.
- Use the I.I. Quick test, chapter: Resolution for evaluating optical sharpness.
- Check the resolution and, if necessary, adjust the wide ring on the optics.
- Perform the additional chapters of the I.Q. Quick test after all the work is complete.

Dose rate

- Check the dose rate and, if necessary, adjust it.

Checking the camera optics centering at the I.I. output

⚠WARNING

X-ray radiation!
See Chapter 1, Safety Information.

Use radiation protection! Wear a lead apron.

- Mark the center of the I.I. input as precisely as possible using a small washer and adhesive tape.
  If there is a laser light localizer, the I.I. attachment with the lead cross can also be used.
- Select the survey format.
- Move the camera into the 0° position.

- Switch fluoro on briefly.
- Mark the center of the washer or lead cross on the monitor (refer to Fig. 9).
- Rotate the camera in the -220° position.
- Mark the center again on the monitor (refer to Fig. 9).
- Rotate the camera in the in +220° position.
- Mark the center again on the monitor (refer to Fig. 9).
- Place an 8 mm washer over the three markings.
  All three markings must be located within the 8mm diameter of the washer. An 8 mm washer has a somewhat larger inner diameter of 8.4 mm, therefore the markings must clearly lie within the inner diameter and should not touch the edge of the washer.
- If the diameter is e 8mm, the following centering adjustment does not have to be performed.
  Continue with "checks and adjustments".
- If the markings exceed > 8 mm, proceed as follows.

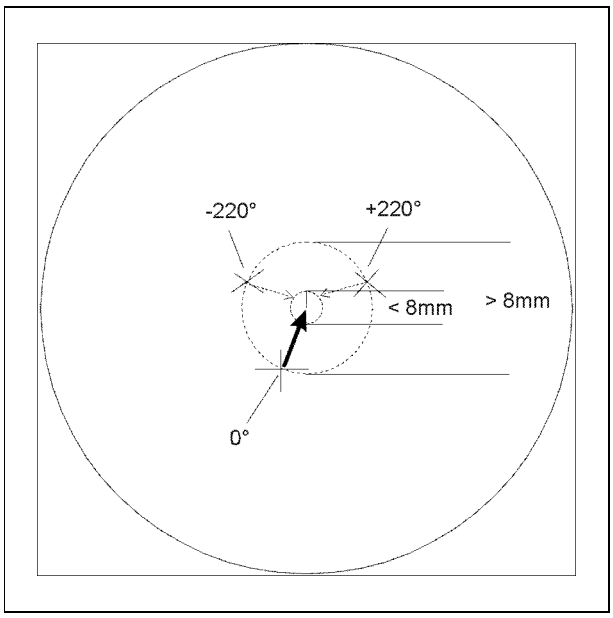


Fig. 8

Centering the camera optics to the I.I. output

⚠WARNING

X-ray radiation!
See Chapter 1, Safety Information.

Use radiation protection! Wear a lead apron.

Prerequisite: The +220°, -220° and 0° positions were already marked as previously described.

- Rotate the camera optics back to the 0° position.
- Loosen the three attachment screws of the camera optics slightly.
- Loosen both eccentric screws adjacent to the camera optics slightly .
- Move the camera optics toward the center, between both +220° and -220° markings (Refer also to Fig. 9).

- Switch fluoro on briefly and evaluate the position on the monitor.
  According to the ratio of the I.I. input screen diameter to the I.I. output screen diameter, a shift of the camera optics by approximately 0.1 mm corresponds to a position shift of the washer displayed on the monitor of more than 1.7 mm (23 cm I.I.).
- Secure the camera optics again.
- Erase the three markings on the monitor.

- Switch fluoro on briefly and mark the new 0° position.
- Rotate the camera to the -220° position.
- Mark the center on the monitor.
- Rotate the camera to the + 220° position.
- Mark the center on the monitor.

- Place an 8 mm washer over the three markings. All three markings must be located within the 8 mm diameter of the washer. An 8 mm washer has a somewhat larger inner diameter of 8.4 mm, therefore the markings must clearly lie within the inner diameter and should not touch the edge of the washer. If necessary, repeat the adjustment, until the three markings fall within the 8 mm diameter.
- Secure the camera optics.
- Retighten the eccentric screws of the camera optics.

Checks and adjustments

- Check the camera rotation and, if necessary, adjust it.
- Check the setting of the radiation iris and, if necessary, readjust it.
- Check the display of the blades on the monitor and adjust, if necessary.
- Check the dose rate again and, if necessary, adjust it.
- Perform the IQ quick test.
- If the "MODULARIS" is present, perform the isocenter check.

MEMOSKOP C-E

NOTE

Check the software status of the newly delivered MEMOSKOP. If the software status of the MEMOSKOP differs from that of the system, the system software status must be downloaded to the MEMOSKOP.
The MEMOSKOP software status can be read out in the 2nd line of the User Setup.
The first number describes the MEMOSKOP type.
(2=CE; 3= CE-100/ C/ C & MOD; 4=C-SUB/ C-SUB & MOD).

NOTE

Read and record the parameters for MEMOSKOP C-E if you are able to select User setup. After replacing the Memoskop, configure the MEMOSKOP C-E according to the parameters recorded.

- Replace the MEMOSKOP C-E.
  The attachment screws are on the underside of the storage device.
- Check the software status of the MEMOSKOP. Download the system software to the MEMOSKOP if necessary.
- Use the MEMOSKOP Service Software to import the language file.
- Configure the MEMOSKOP C-E for the correct video frequency and the number of monitors present.
  Refer to chapter 5 "MEMOSKOP C-E without Keyboard, Emulation ...", "Configuring the Video frequency" and "MEMOSKOP-Configuration for the number of existing monitors".
- Configure the following parameters in Technical Setup for the MEMOSKOP:

Number of Monitors	Configure 1 for SIREMOBIL with 1 monitor. Configure 2 for SIREMOBIL with 2 monitors.
Hardcopy	Check whether 5000 is programmed in "4 Max Hardcopy time". If not, program this value.
Edge 1 coef set	Check whether 3 is programmed, if not, program this value.
Edge 2 coef set	Check whether 8 is programmed, If not, program this value.
Motion detection setup	Check whether the following are programmed MD1: Threshold 100 and at MD2: Threshold 120. If not, program these values.
Date / Time format	Set to country-specific format.
Keyboard	Set to the keyboard layout being used.
Display of realtime clock	Configure Yes. Configure No only upon customer request.
Display of rotated images	Configure Yes.
Monitor zoom	Configure No.
Default LUT	Configure 2. Program a different LUT curve only upon customer request.
Default Edge	Configure 1. Program a different Edge enhancement value only upon customer request.
Monitor split	Configure Yes.
Monitor text	Configure Yes.

Maximum image number	n.a.
Disable doserate selection in user setup	Program for "No" when equipped with an area dose product measurement device. The menu "Storage of Dose on disk" and the menu "Dose on Hardcopy output" in User Setup are visible. Otherwise set to "Yes".
Unit serial number	Program the serial number of the SIREMOBIL. Do not enter the leading zero.
Product name	Program "SIREMOBIL Iso-C".
Default program changeable	Default: Yes. Depending on country specific regulations configure Yes or No.
Software backward compatible	Configure "No".

- Configure the following parameters in User setup for MEMOSKOP:

Operating mode Parameters	Change the parameters programmed for the organ program upon customer request.
VCR output	Configure to Monitor A.
Hardcopy Release	For SIREMOBILwith 1 monitor: Configure to monitor A. For SIREMOBIL with 2 monitors: Configure to monitor B.
Text monitor	For SIREMOBIL with 1 monitor: Configure to monitor A. For SIREMOBIL with 2 monitors: Configure to both monitors.
Split Screen	Configure horizontally. Configure vertically only upon customer request.
Display of time	Configure Yes.
Set Date Time	Set the current date and time.
Hospital Name	Program the hospital name.
Storage of Dose on disk	If the area dose product meter is present, (Diamentor) configure Yes. Otherwise, configure No.
Dose on Hardcopy output	If the area dose product meter is present, (Diamentor) configure Yes. Otherwise configure No.

- Perform the IQ quick test.

NOTE

With present System MODULARIS the parameters for the Lithoprogram have to be set again according the Service Instructions LITHOSTAR MODULARIS.

MEMOSKOP C-E 100

NOTE

Check the software status of the newly delivered MEMOSKOP. If the software status of the MEMOSKOP differs from that of the system, the system software status must be downloaded to the MEMOSKOP.
The MEMOSKOP software status can be read out in the 2nd line of the User Setup.
The first number describes the MEMOSKOP type.
(2=CE; 3= CE-100/ C/ C & MOD; 4=C-SUB/ C-SUB & MOD).

NOTE

The image storage MEMOSKOP C-E 100 is a new image storage that works only with the correct number of images. For this reason, if the image storage was set to its default values (Menu "Diagnostics", "Load Factory Defaults"), the parameter "Maximum image numbers" must be set to 100 images.

Read and record the parameters for MEMOSKOP C-E 100 if you can select User setup. After replacing the MEMOSKOP, configure the MEMOSKOP C-E 100 according to the parameters noted.

- Replace the MEMOSKOP C-E 100.
  The attachment screws are accessible on the underside of the storage device.
- Check the software status of the MEMOSKOP. Download the system software to the MEMOSKOP if necessary.
- Use the MEMOSKOP Service Software to import the language file.
- Set the MEMOSKOP C-E 100 to the correct video frequency and configure it for the number of existing monitors.
  Refer to chapter 5 "Configuring the video frequency " and "MEMOSKOP - Configuration for the number of existing monitors ."
- Configure the following parameters in Technical Setup for MEMOSKOP:

Number of Monitors	Configure 1 for SIREMOBIL with 1 monitor. Configure 2 for SIREMOBIL with 2 monitors.
Hardcopy	Check whether 5000 is programmed in "4 Max Hardcopy time". If not, program this value.
Edge 1 coef set	Check whether 3 is programmed, If not, program this value.
Edge 2 coef set	Check whether 8 is programmed, If not, program this value.
Motion detection setup	Check whether the following are programmed "MD1: Threshold" 100 and for "MD2: Threshold" 120. If not, program these values.
Date / Time format	Set the country-specific format.
Keyboard	Set to the keyboard layout being used.
Language	Set for language of the country.
Display of realtime clock	Configure Yes. Select No only upon customer request.
Display of rotated images	Configure Yes.

Monitor zoom	Configure No.
Monitor split	Configure Yes.
Monitor text	Configure Yes.
Maximum image number	**Configure 100.**
Disable doserate selection in user setup	Set to "No" when equipped with an area dose product measurement device. The menu "Storage of Dose on disk" and the menu "Dose on Hardcopy output" in User Setup are visible. Otherwise set to "Yes".
Unit serial number	Program the serial number of the SIREMOBIL. Do not enter the leading zero.
Product name	Program "SIREMOBIL Iso-C".
Default program changeable	Default: Yes. Depending on country specific regulations configure Yes or No.
Create external disk	Configure No.
Default LUT	Configure 2. Program a different LUT curve only upon customers request.
Default Edge	Configure 1. Program a different Edge enhancement value only upon customers request.
Software backward compatible	Configure No.

- Configure the following parameters in User setup for MEMOSKOP:

Operating mode Parameters	Change the programmed parameters only upon customer request.
VCR output	Configure to monitor A.
Hardcopy Release	For SIREMOBIL with 1 monitor: configure to monitor A. For SIREMOBIL with 2 monitors: Configure to monitor B.
Text monitor	For SIREMOBIL with 1 monitor: configure to monitor A. For SIREMOBIL with 2 monitors: configure to both monitors.
Split screen	Configure horizontally. Configure vertically only upon customer request.
Display of time	Configure Yes.
Set Date Time	Set the current date and time.
Hospital Name	Program the hospital name.
Storage of Dose on disk	If area dose product meter is present, (Diamentor) configure Yes. Otherwise configure No.
Dose on Hardcopy output	If area dose product meter is present, (Diamentor) configure yes. Otherwise configure No.

- Perform IQ quick test.

NOTE

With present System MODULARIS the parameters for the Litho-program have to be set again according the Service instructions LITHOSTAR MODULARIS.

MEMOSKOP C / MEMOSKOP C & MOD

NOTE

Check the software status of the newly delivered MEMOSKOP. If the software status of the MEMOSKOP differs from that of the system, the system software status must be downloaded to the MEMOSKOP.
The MEMOSKOP software status can be read out in the 2nd line of the User Setup.
The first number describes the MEMOSKOP type.
(2=CE; 3= CE-100/ C/ C & MOD; 4=C-SUB/ C-SUB & MOD).

NOTE

Read and record the parameters for MEMOSKOP if you can select User setup. After replacing the MEMOSKOP, configure the MEMOSKOP according to the parameters noted.

- Replace the MEMOSKOP .
  The attachment screws are accessible on the underside of the storage device.
- Check the software status of the MEMOSKOP. Download the system software to the MEMOSKOP if necessary.
- Use the MEMOSKOP Service Software to import the language file.
- Set the MEMOSKOP C to the correct video frequency and configure it for the number of existing monitors.
  Refer to chapter 5 "Configuring the video frequency " and "MEMOSKOP - Configuration for the number of existing monitors ."
- Configure the following parameters in Technical Setup for MEMOSKOP:

Number of Monitors	Configure 1 for SIREMOBIL with 1 monitor. Configure 2 for SIREMOBIL with 2 monitors.
Hardcopy	Check whether 5000 is programmed in "4 Max Hardcopy time". If not, program this value.
Edge 1 coef set	Check whether 3 is programmed, If not, program this value.
Edge 2 coef set	Check whether 8 is programmed, If not, program this value.
Motion detection setup	Check whether the following are programmed "MD1: Threshold" 100 and for "MD2: Threshold" 120. If not, program these values.
Date / Time format	Set the country-specific format.
Keyboard	Set to the keyboard layout being used.
Language	Set for language of the country.
Display of realtime clock	Configure Yes. Select No only upon customer request.
Display of rotated images	Configure Yes.
Monitor zoom	Configure No.
Monitor split	Configure Yes.
Monitor text	Configure Yes.
Maximum image number	Configure 700.

Disable doserate selection in user setup	Set to "No" when equipped with an area dose product measurement device. The menu "Storage of Dose on disk" and the menu "Dose on Hardcopy output" in User Setup are visible. Otherwise set to "Yes".
Unit serial number	Program the serial number of the SIREMOBIL. Do not enter the leading zero.
Default LUT	Configure 2. Only upon customers request program a different LUT curve.
Default Edge	Configure 1. Only upon customers request program a different Edge enhancement value.
Software backward compatible	Configure No.
Product name	Program "SIREMOBIL Iso-C".
Default program changeable	Default: Yes. Depending on country specific regulations configure Yes or No.
Create external disk	If the option "3D Reconstruction" or the option "DICOM Bridge" is installed or a MOD drive is present, configure Yes. Otherwise configure No.
Enable Bridge	If the option "3D Reconstruction" or the option "DICOM Bridge" is installed or a MOD drive is present, configure Yes. Otherwise configure No.
Delay 3D-PC/ DICOM Bridge	Only available of if option "3D Reconstruction" is installed. Configure 120.
Interface to 3D-PC	Only available if option "3D Reconstruction" is installed. Configure yes.

- Configure the following parameters in User setup for MEMOSKOP:

Operating mode Parameters	Change the programmed parameters only upon customer request.
VCR output	Configure to monitor A.
Hardcopy Release	For SIREMOBIL with 1 monitor: configure to monitor A. For SIREMOBIL with 2 monitors: Configure to monitor B.
Text monitor	For SIREMOBIL with 1 monitor: configure to monitor A. For SIREMOBIL with 2 monitors: Configure to both monitors.
Split screen	Configure horizontally. Configure vertically only upon customer request.
Display of time	Configure Yes.
Set Date Time	Set the current date and time.
Hospital Name	Program the hospital name.
Storage of Dose on disk	If area dose product meter is present, (Diamentor) configure Yes. Otherwise configure No.

Dose on Hardcopy output	If area dose product meter is present, (Diamentor) configure yes. Otherwise configure No.

- Perform the IQ quick test.

NOTE	**With present System MODULARIS the parameters for the Litho-program have to be set again according the Service instructions LITHOSTAR MODULARIS.**

MEMOSKOP C-SUB / MEMOSKOP C-SUB & MOD

NOTE	**Check the software status of the newly delivered MEMOSKOP. If the software status of the MEMOSKOP differs from that of the system, the system software status must be downloaded to the MEMOSKOP. The MEMOSKOP software status can be read out in the 2nd line of the User Setup. The first number describes the MEMOSKOP type. (2=CE; 3= CE-100/ C/ C & MOD; 4=C-SUB/ C-SUB & MOD).**

NOTE	**Read and record the parameters for MEMOSKOP C-SUB if you can select User setup. After replacing the MEMOSKOP C-SUB, according to the parameters recorded.**

- Check the software status of the MEMOSKOP. Download the system software to the MEMOSKOP if necessary.
- Use the MEMOSKOP Service Software to import the language file.
- Replace the MEMOSKOP C-SUB.
  The attachment screws are accessible on the underside of the storage device.
- Set the MEMOSKOP C-SUB to the correct video frequency and configure it for the number of existing monitors.
  Refer to chapter 5 "Configuring the video frequency " and "MEMOSKOP - Configuration for the number of existing monitors ."
- Configure the following parameters in Technical Setup for Memoskop:

Number of Monitors	Configure 1 for SIREMOBILwith 1 monitor. Configure 2 for SIREMOBIL with 2 monitors.
Hardcopy	Check whether 5000 is programmed in "4 Max Hardcopy time". If not, program this value.
Edge 1 coef set	Check whether 3 is programmed, If not, program this value.
Edge 2 coef set	Check whether 8 is programmed, If not, program this value.
Motion detection setup	Check whether the following are programmed "MD1: Threshold" 100 and for "MD2: Threshold" 120. If not, program these values.
Date / Time format	Set the country-specific format.
Keyboard	Set to the keyboard layout being used.

Language	Set for language of the country.
Display of realtime clock	Configure Yes. Select No only upon customer request.
Display of rotated images	Configure Yes.
Monitor zoom	Configure No.
Monitor split	Configure Yes.
Monitor text	Configure Yes.
Maximum image number	Configure 900.
Disable doserate selection in user setup	Set to "No" when equipped with an area dose product measurement device. The menu "Storage of Dose on disk" and the menu "Dose on Hardcopy output" in User Setup are visible. Otherwise set to "Yes".
Unit serial number	Program the serial number of the SIREMOBIL. Do not enter the leading zero.
Product name	Program "SIREMOBIL Iso-C".
Software backward compatible	Configure No.
Default program changeable	Default: Yes. Depending on country specific regulations configure Yes or No.
Create external disk	If the option "3D Reconstruction" or the option "DICOM Bridge" is installed or a MOD drive is present, configure Yes. Otherwise configure No.
Enable Bridge	If the option "3D Reconstruction" or the option "DICOM Bridge" is installed or a MOD drive is present, configure Yes. Otherwise configure No.
Delay 3D-PC/ DICOM Bridge	Only available of if option "3D Reconstruction" is installed. Configure 120.
Interface to 3D-PC	Only available if option "3D Reconstruction" is installed. Configure yes.
Default LUT	Configure 2. Only upon customers request program a different LUT curve.
Default Edge	Configure 1. Only upon customers request program a different Edge enhancement curve.
Default LUT for Subtraction	Configure 1. Only upon customers request program a different LUT curve.
Subtraction K-Factor, phase A	Program "32". Program a different value only upon customer request.
Subtraction K-Factor, phase B	Program "MD 2". Program a different value only upon customer request.
Subtraction Time of phase A	Program "4,5". Program a different value only upon customer request.
Roadmap K-Factor, phase A	Program "32" . Program a different value only upon customer request.

Roadmap K-Factor, phase B	Program "MD 2". Program a different value only upon customer request.
Roadmap K-Factor, phase C	Program "MD 2". Program a different value only upon customer request.
Roadmap Time of phase A	Program "4,5". Program a different value only upon customer request.

- Configure the following parameters in User setup for MEMOSKOP:

Operating mode Parameters	Change the programmed parameters only upon customer request.
VCR output	Configure to monitor A.
Hardcopy Release	For SIREMOBIL with 1 monitor: configure to monitor A. For SIREMOBIL with 2 monitors: Configure to monitor B.
Text monitor	For SIREMOBIL with 1 monitor: configure to monitor A. For SIREMOBIL with 2 monitors: configure to both monitors.
Split screen	Configure horizontally. Configure vertically only upon customer request.
Display of time	Configure Yes.
Set Date Time	Set the current date and time.
Hospital Name	Program the hospital name.
Storage of Dose on disk	If area dose product meter is present, (Diamentor) configure Yes. Otherwise configure No.
Dose on Hardcopy output	If area dose product meter is present, (Diamentor) configure yes. Otherwise configure No.

- Perform the IQ quick test.

NOTE

With present System MODULARIS the parameters for the Litho-program have to be set again according the Service instructions LITHOSTAR MODULARIS.

MULTISPOT 2000

Before installing the new MULTISPOT 2000, set the correct refresh rate. Refer to Table 1.

50 Hz Refresh rate		60 Hz Refresh rate	
Jumper	Position	Jumper	Position
X4	b	X4	a
X5	open	X5	open
X6	b	X6	a
X7	b	X7	a
X8	b	X8	a
X9	b	X9	a
X10	b	X10	a
X11	b	X11	a

Tab. 1

- Disconnect the SIREMOBIL line voltage plug from the receptacle.
- Replace the MULTISPOT 2000.
- The screws securing the MULTISPOT 2000 are accessible on the underside of the camera.
- Perform a camera function test after the replacement.
- Generate and program the exposure parameters for the Multispot 2000 according to the IQ Quick test (refer to the log book). Record the new exposure parameters in the IQ Quick test instructions.

Area dose product meter

- Remove the SIREPHOS cover.
- Replace the area/dose product measurement device.
- Perform the calibration of the area dose product measurement device. Refer to chapter 5 "Calibrating the Area Dose Product Measurement".
- Test the accuracy of the area dose product measurement device. Refer to chapter 5 "Testing the accuracy of the area dose product measurement device.
- Refit the SIREPHOS cover.
- Seal the SIREPHOS cover using sealing compound. See Chapter 1, "Covers".

Laser Targeting Device

- Remove the SIREPHOS cover.
- Replace the laser diodes after removing the plastic bracket and desoldering the wires.
- Adjust the laser diodes using the adjustment device supplied with the laser targeting device.
- Refit the SIREPHOS cover.
- Seal the SIREPHOS cover using sealing compound. See Chapter 1, "Covers".

Mouse, external mouse and PC keyboard

NOTE	Only applies to SIREMOBIL Iso-C 3D.

- The system comes with a mouse and an external mouse. Both are connected to the mouse interface of the 3D reconstruction PC by means of a mouse Y-switch.
  The keyboard is connected to the keyboard interface of the 3D reconstruction PC.

Replacing the mouse

- Switch the system off.
- Open the rear panel of the monitor trolley and the paneling of the 3D reconstruction PC.
- Replace the mouse. To do so, pull the mouse connector out of the mouse Y-switch, cut the cable ties at the spring steel band and pull the cable out of the cable duct.
- Run the cable of the new mouse through the cable duct and along the spring steel band and reconnect it.
- Reattach the cable from the mouse Y-switch to the keyboard compartment to ensure that there is sufficient cable length in the keyboard compartment.
- Using cable ties, tie the cable (incl. keyboard cable) to the spring steel band again at a distance of approx. 10 cm.
- Perform a function check of the mouse, the external mouse and the keyboard.
- Reattach the paneling.

Replacing the external mouse

- Switch the system off.
- Unplug the external mouse at the rear and replace it with the new external mouse.
- Perform a function check of the mouse, the external mouse and the keyboard.

Replacing the PC keyboard

- Switch the system off.
- Open the rear panel of the monitor trolley and the paneling of the 3D reconstruction PC.
- Replace the keyboard. To do so, unplug the keyboard at the 3D reconstruction PC, cut the cable ties at the spring steel band and pull the cable out of the cable duct.
- Run the cable of the new keyboard through the cable duct and along the spring steel band and reconnect it.
- Using cable ties, tie the cable (incl. mouse cable) to the spring steel band again at a distance of approx. 10 cm.
- Perform a function check of the mouse, the external mouse and the keyboard.
- Reattach the paneling.

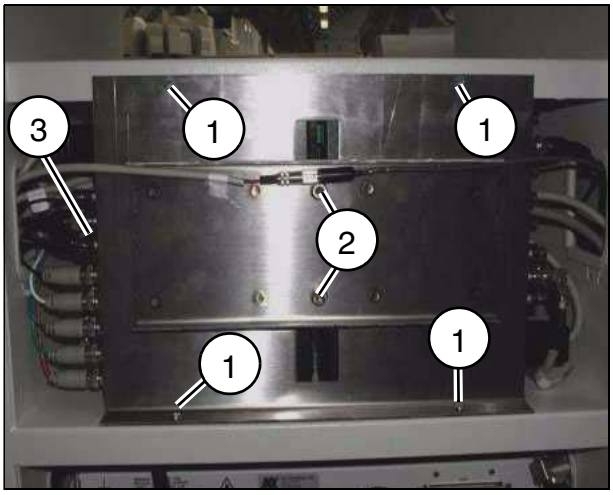


Fig. 9

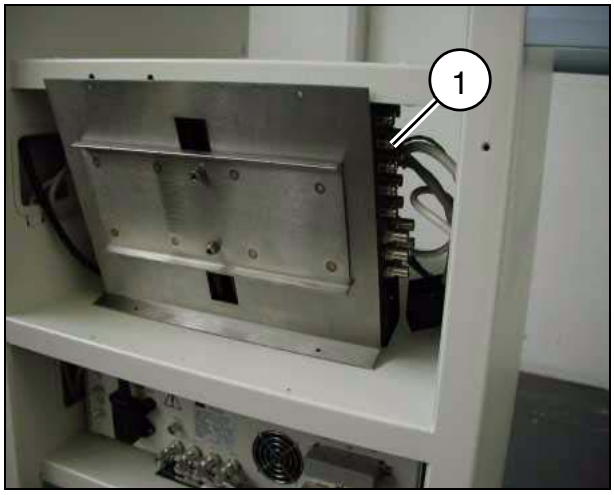


Fig. 10

Video switcher

NOTE	**Only applies to SIREMOBIL Iso-C 3D.**

NOTE	**Video switcher 1 (3/Fig. 9) is used to switch the video signal between the MEMOSKOP and the 3D reconstruction PC. Video switcher 2 (1/Fig. 10) is used to route the video signal to the video printer.**

- Switch the system off.
- Loosen the four fastening screws of the securing bracket (1/Fig. 9).
- Loosen the two clamping screws, but do not unscrew them completely (2/Fig. 9).
- Tip the holding plate with the video switchers into the monitor trolley compartment (see Fig. 10).
- Unplug the connectors of the video switcher to be replaced.
- Pull the video switcher to be replaced out of the holding plate from the side.
- Depress the green button on the video switcher.
- Push the new video switcher into the holding plate and reconnect all connectors.
- Screw the holding plate back onto the monitor trolley.
- Tighten the two clamping screws again.
- Switch the system on.
- After the system run-up, the SIMOMED HM Monitor (reference monitor) should display the MEMOSKOP reference image. If the run-up process of the 3D reconstruction PC or the syngo interface appears, the green button of video switcher 1 is in the wrong position and needs to be switched over. (3/Fig. 9) points to video switcher 1.
- Perform the IQ quick test.

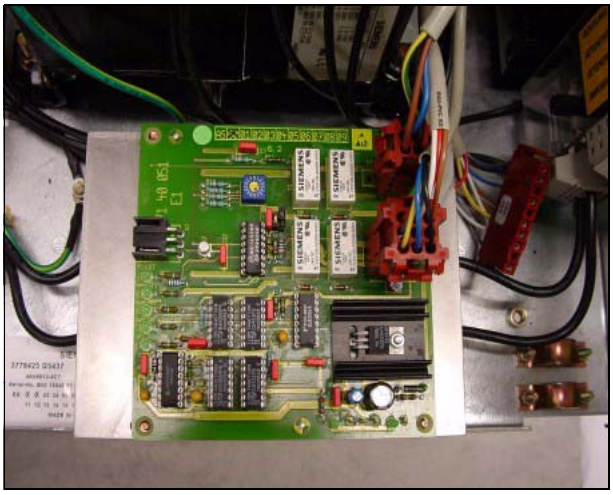


Fig. 11

Cutt-off delay - PC board D210

⚠WARNING	**Electrical voltage!** **See Chapter 1, Safety Information.** **Switch system power supply off and disconnect the power plug.**

NOTE	**Only applies to SIREMOBIL Iso-C 3D.**

- In the monitor trolley, PC board D210 is installed above the mains filter (Fig. 11) .
- Disconnect the system from the power supply by pulling the mains plug out of the mains socket.
- Loosen the 4 fastening nuts of PC board D210.
- Unplug all connectors.
- Replace board D210 and fasten the new PC board with the 4 nuts.
- Reconnect all connectors.
- Connect the monitor trolley to the power supply again.
- Switch the monitor trolley on and wait for the run-up.
- Check the cut-off delay.
- After the power OFF button has been pressed, the monitor trolley must switch off after approx. 3 minutes.

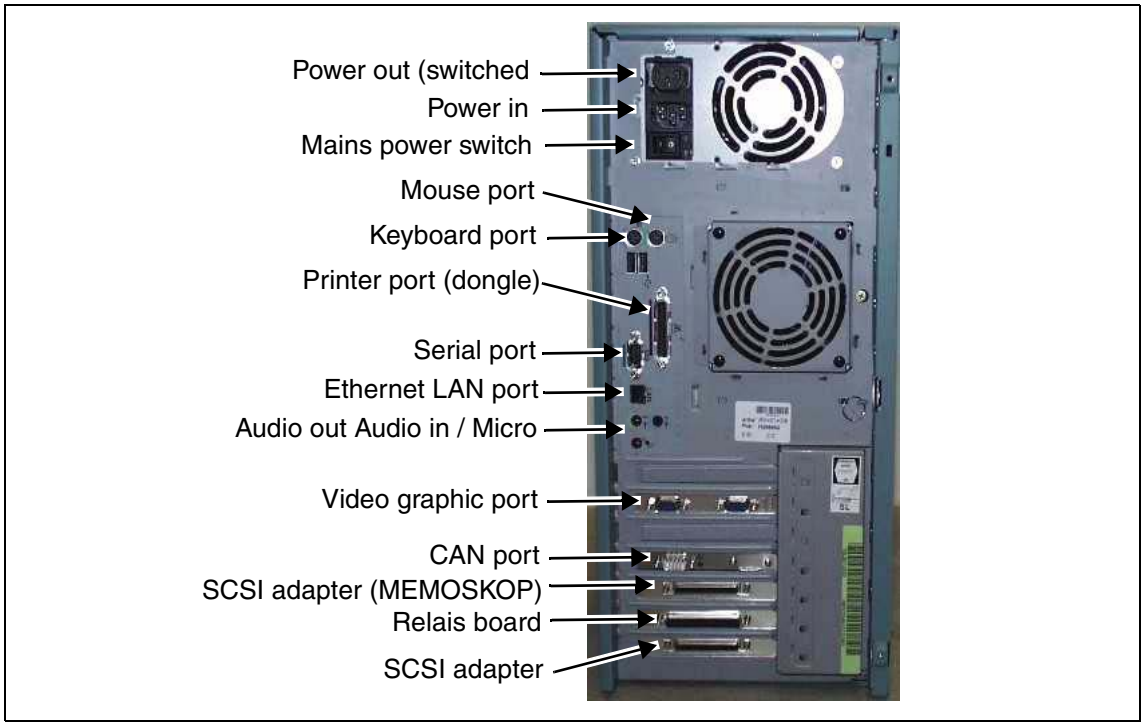


Fig. 12

3D reconstruction PC

NOTE	Only applies to SIREMOBIL Iso-C 3D.

- Disconnect the system from the power supply by pulling the mains plug out of the mains socket.
- The syngo software and the backup/restore disk are kept in the monitor trolley logbook.
- Unplug all connectors on the PC.
- Unscrew the dongle from the printer port of the PC and reinstall it on the new PC (see Fig. 12).
- Replace the PC.
- Reconnect all connectors.
- Perform the startup of the 3D reconstruction PC as described in the Startup Instructions, Chapter 4.
- Then insert the backup / restore disk (in the logbook compartment of the SIREMOBIL Iso-C) into the disk drive of the PC.
- Start the syngo service software.
- Select the Backup / Restore menu and restore the data.
- Perform a function check of the PC.
- Perform the IQ quick test.
- Check the DICOM functionality of the PC, if applicable.

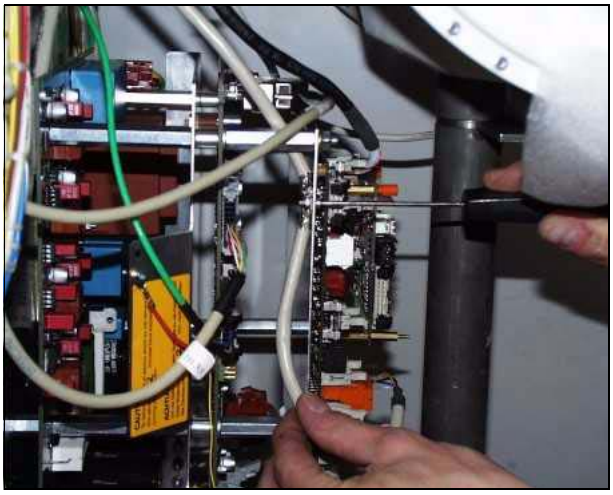


Fig. 13

SIMOMED HM monitor

NOTE	Only applies to SIREMOBIL Iso-C 3D.

- Switch the system off.
- Replace the monitor.
- Perform the monitor settings as described in the Startup Instructions, Chapter 8.
- Perform the IQ quick test.

3D reconstruction system electronics

NOTE	Only applies to SIREMOBIL Iso-C 3D.

- The 3D reconstruction system electronics (PC boards D200 incl. MCB300 and D10) is attached in front of PC board D1 in the basic unit (Fig. 13).
- Switch the system off.
- Unplug all connectors.
- Replace the module.
- Reconnect all connectors.
- Fasten the shielded cables in the shield connectors again, ensuring good ground contact of the shielding.
- If cable ties have been removed, attach the cables with cable ties again.
- Perform a download of the control software as described in the Startup Instructions, Chapter 5.
- Perform the mechanical settings as described in the Startup Instructions, Chapter 6.
- Perform chapters 10 and 11 of the IQ quick test.

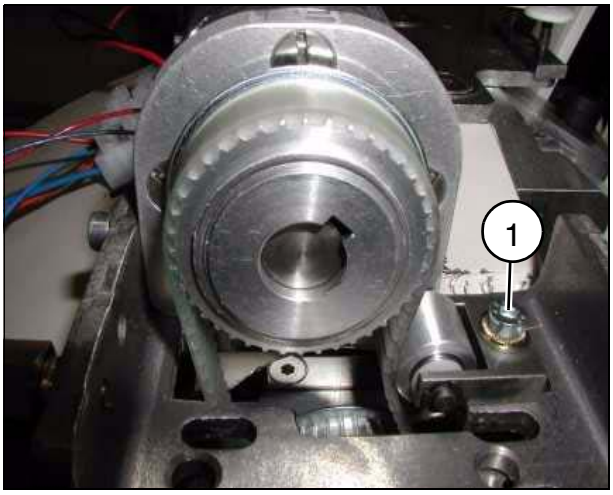


Fig. 14

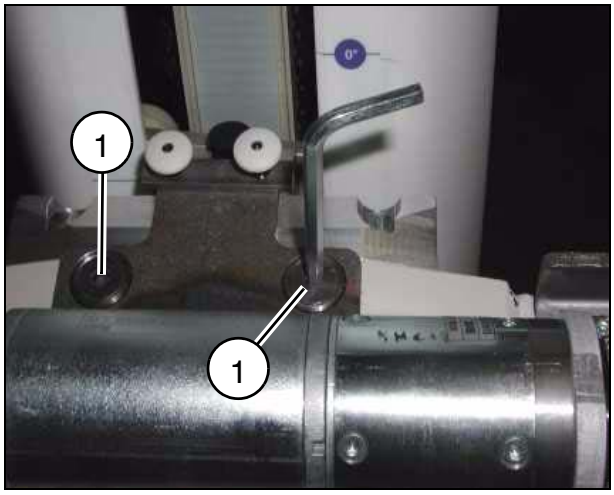


Fig. 15

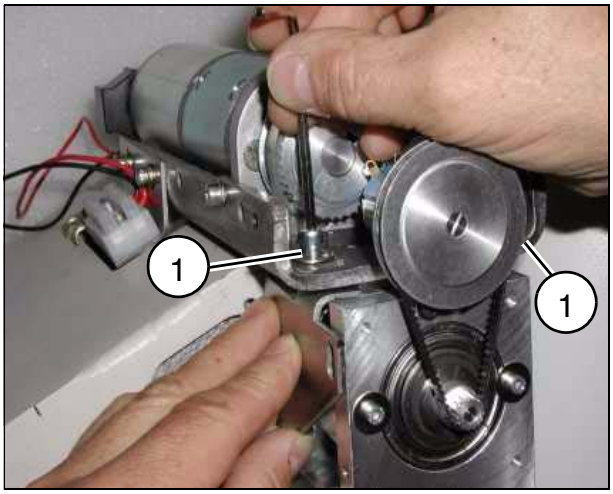


Fig. 16

Orbital motor

NOTE	Only applies to SIREMOBIL Iso-C 3D.

- Loosen the belt tensioner of the toothed-belt orbital drive (1/Fig. 14).
- Disconnect the connecting cables of the motor (motor cables + incremental encoder).
- Loosen the 2 fastening screws of the mounting plate (incl. motor) (1/Fig. 15).
- Loosen the 2 fastening screws at the two lateral brackets (1/Fig. 16).
- Carefully remove the mounting plate incl. motor. In doing so, push the toothed belt off the pulley, ensuring that the actual value potentiometer and its pulley are not damaged or bent.
- Detach the motor from the mounting plate.
- Screw the new motor onto the mounting plate.

- Reattach the mounting plate incl. motor. In doing so, place the toothed belt over the pulley again, ensuring that the actual value potentiometer and its pulley are not damaged or bent.
- Retighten the toothed belt of the orbital drive (1/Fig. 14). When depressed by thumb pressure on the opposite side, the belt should give approx. 2 to 3 mm.
- Perform a function check of the orbital drive. To do this, perform a 3D scan.

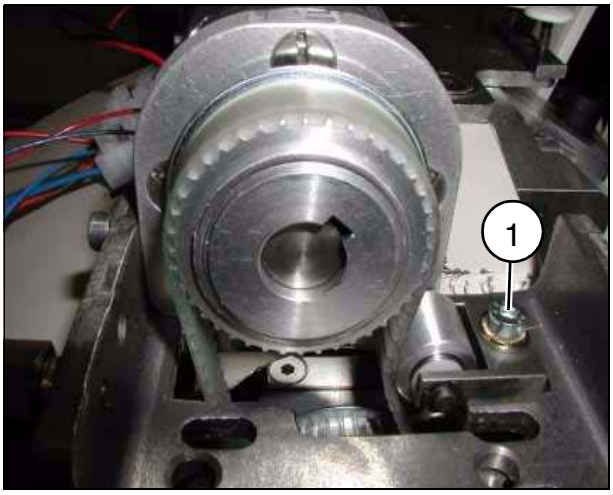


Fig. 17

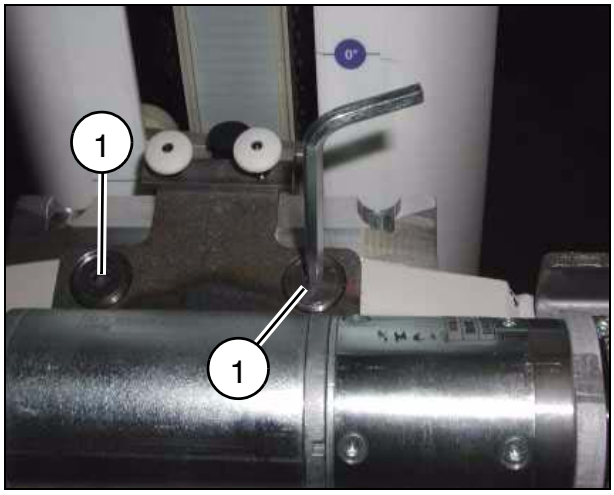


Fig. 18

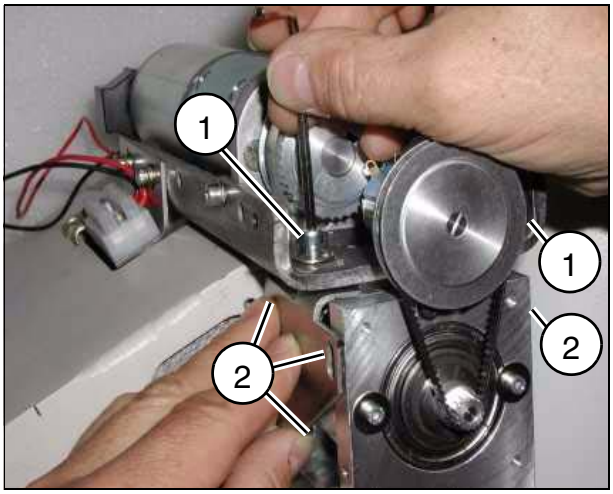


Fig. 19

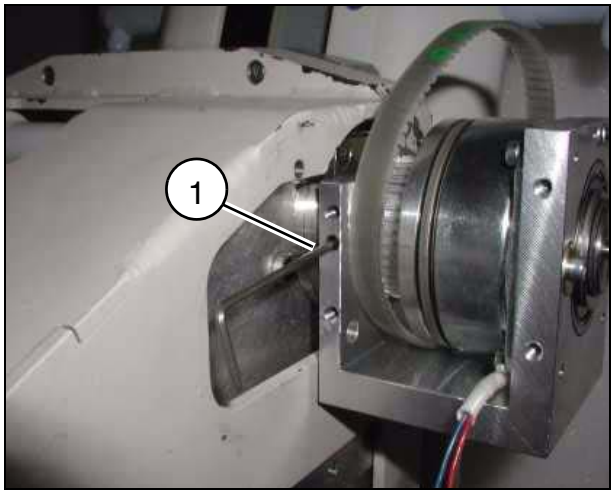


Fig. 20

Orbital drive toothed belt

NOTE	**Only applies to SIREMOBIL Iso-C 3D.**

- Loosen the belt tensioner of the toothed-belt orbital drive (1/Fig. 17).
- Disconnect the connecting cables of the orbital motor (motor cables + incremental encoder).
- Loosen the 2 fastening screws of the mounting plate (incl. motor) (1/Fig. 18).
- Loosen the 2 fastening screws at the two lateral brackets (1/Fig. 19).
- Carefully remove the mounting plate incl. motor. In doing so, push the toothed belt off the pulley, ensuring that the actual value potentiometer and its pulley are not damaged or bent.
- Unscrew the two lateral brackets from the coupling unit (3 Allen screws each, (2/Fig. 19).

- Remove the two setscrews of the coupling unit (1/Fig. 20) shows the length of the left setscrew. Also remove the right setscrew (not shown).
- Remove the coupling unit from the centering disk.
- Take the toothed belt off the pulley.
- Place the new belt on the pulley.
- Place the coupling unit back on the centering disk, ensuring that the shaft engages in the intermediate piece.
- Press the coupling unit against the centering disk and screw it back on with the two set-screws (1/Fig. 20).
- Reinstall the mounting plate incl. motor. In doing so, place the toothed belt on the pulley again, ensuring that the actual value potentiometer and its pulley are not damaged or bent. Reconnect the motor and incremental encoder.
- Reattch the two lateral brackets (2/Fig. 19). For guidance first insert the top two screws (1/Fig. 19), but do not yet tighten them completely. Tighten the lateral screws first, then tighten the top two screws (2/Fig. 19).
- Tension the toothed belt of the orbital drive again (1/Fig. 17). When depressed by thumb pressure on the opposite side, the belt should give approx. 2 to 3 mm.
- Perform the mechanical settings according to the Startup Instructions, Chapter 6.

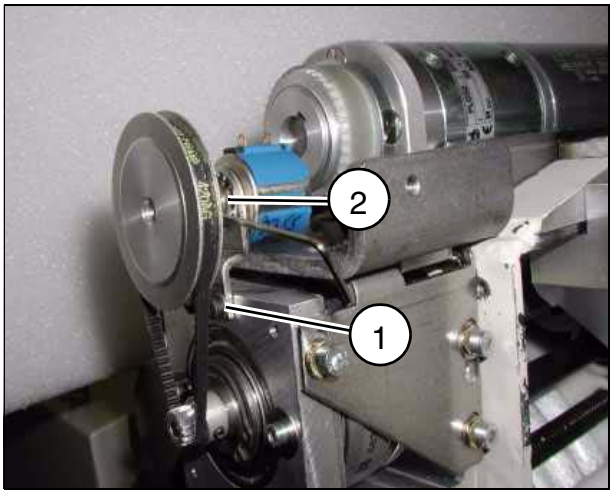


Fig. 21

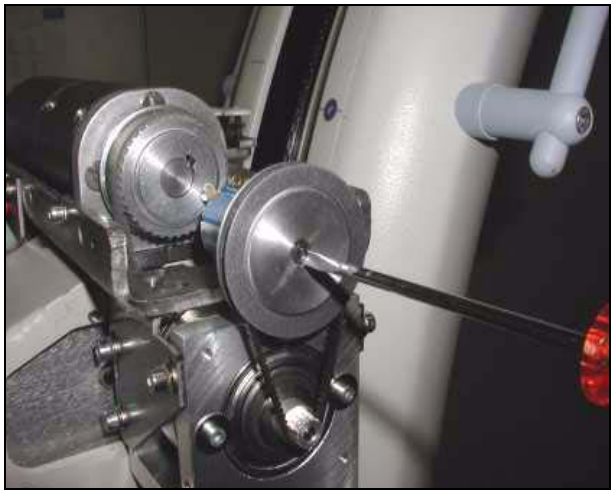


Fig. 22

Orbital drive actual value potentiometer

NOTE	Only applies to SIREMOBIL Iso-C 3D.

- Move the C-arm orbitally into the -95° end position:
- The orbital limit switch on the tube unit side is actuated.
- Take note of the order in which the cables of the actual value potentiometer are connected.
- Unsolder the connecting cables of the actual value potentiometer.
- Loosen the two fastening screws of the actual value potentiometer at the front of the coupling unit (1/Fig. 21).
- Take the belt off the pulleys.
- Remove the actual value potentiometer.
- Unscrew the Allen screw of the large pulley and remove the pulley from the actual value potentiometer (2/ Fig. 21).
- Unscrew the securing bracket from the old potentiometer and attach it to the new potentiometer.
- Attach the large pulley to the new actual value potentiometer.
- Reattach the actual value potentiometer to the coupling unit. In doing so, place the toothed belt on the pulley again and tension it. The toothed belt should be tight, but without any mechanical tension.
- Solder the connecting cables back to the potentiometer in the original order.

Setting the actual value potentiometer for C-arm orbital movement

NOTE	**Prior to setting the actual value potentiometer the C-arm must be in the orbital -95° position (The orbital limit switch on the tube side is actuated). If this is not yet the case, loosen the Allen screw of the large pulley before moving the C-arm (2/Fig. 21) to prevent overturning of the actual value potentiometer.**

- The C-arm is in the -95° position. See note.
- Loosen the Allen screw of the large pulley (2/Fig. 21).
- Using a screwdriver, turn the actual value potentiometer counterclockwise to the end stop (Fig. 22).
- Then turn it clockwise two turns.
- Retighten the Allen screw of the large pulley.
- Perform the mechanical settings according to the Startup Instructions, Chapter 6.

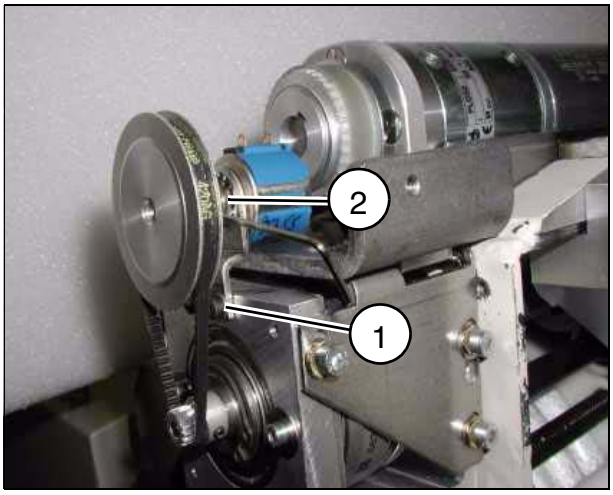


Fig. 23

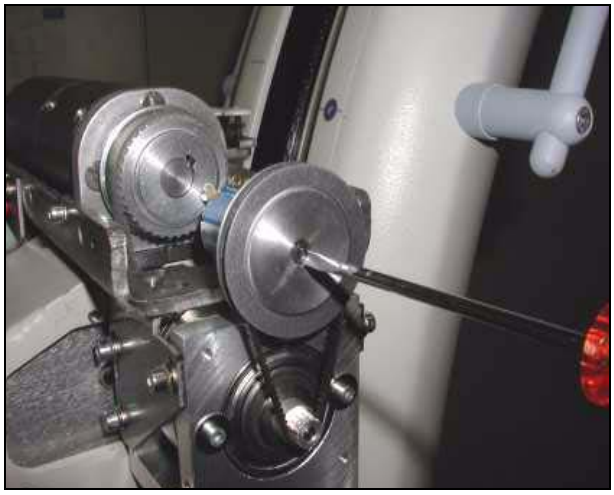


Fig. 24

Belt of the actual value potentiometer for orbital movement

NOTE	**Only applies to SIREMOBIL Iso-C 3D.**

- Move the C-arm orbitally into the -95° end position.
- The orbital limit switch on the tube unit side is actuated.
- Loosen the two fastening screws of the actual value potentiometer on the front of the coupling unit, but do not unscrew them (1/Fig. 23).
- Take the toothed belt off the pulleys.
- Place the new toothed belt on the pulleys.
- Tension the belt: The toothed belt should be tight, but without any mechanical tension.
- Retighten the two fastening screws.

Setting the actual value potentiometer for C-arm orbital movement

NOTE	**Prior to setting the actual value potentiometer the C-arm must be in the orbital -95° position (The orbital limit switch on the tube side is actuated). If this is not yet the case, loosen the Allen screw of the large pulley before moving the C-arm (2/Fig. 23) to prevent overturning of the actual value potentiometer.**

- The C-arm is in the -95° position. See note.
- Loosen the Allen screw of the large pulley (2/Fig. 23).
- Using a screwdriver, turn the actual value potentiometer counterclockwise to the end stop (Fig. 24).
- Then turn it clockwise two turns.
- Retighten the Allen screw of the large pulley.
- Perform the mechanical settings as described in the Startup Instructions, Chapter 6.

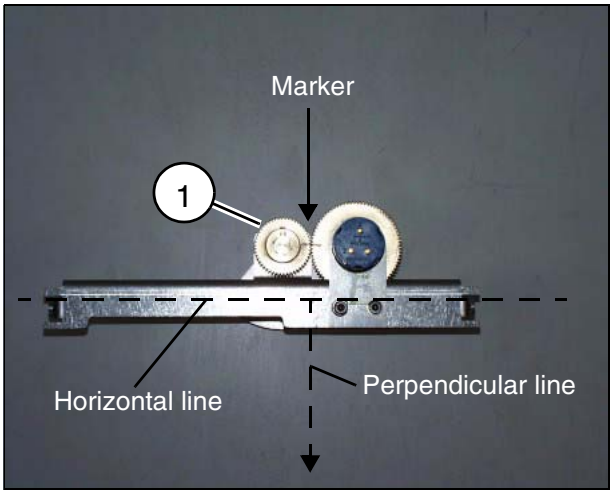


Fig. 25

Angulation part

NOTE	**Only applies to SIREMOBIL Iso-C 3D.**
NOTE	**When the angulation part is vertical, the markings on the two toothed belts must coincide (see Fig. 25).**

- If the toothed wheel (1/Fig. 25) was turned several times during transport, prior to installation the perpendicular must be turned in one direction until the markings coincide again when the angulation part is vertical.
- Move the C-arm to the 0° position.
- Disconnect the cable of the actual value potentiometer.
- Loosen the fastening screws of the angulation part.
- Replace the angulation part. In doing so, ensure that, when the C-arm is perpendicular, the markings (black lines) on the two toothed wheels coincide.
- Reconnect the cable of the actual value potentiometer.

Perform the mechanical settings according to the Startup Instructions, Chapter 6.

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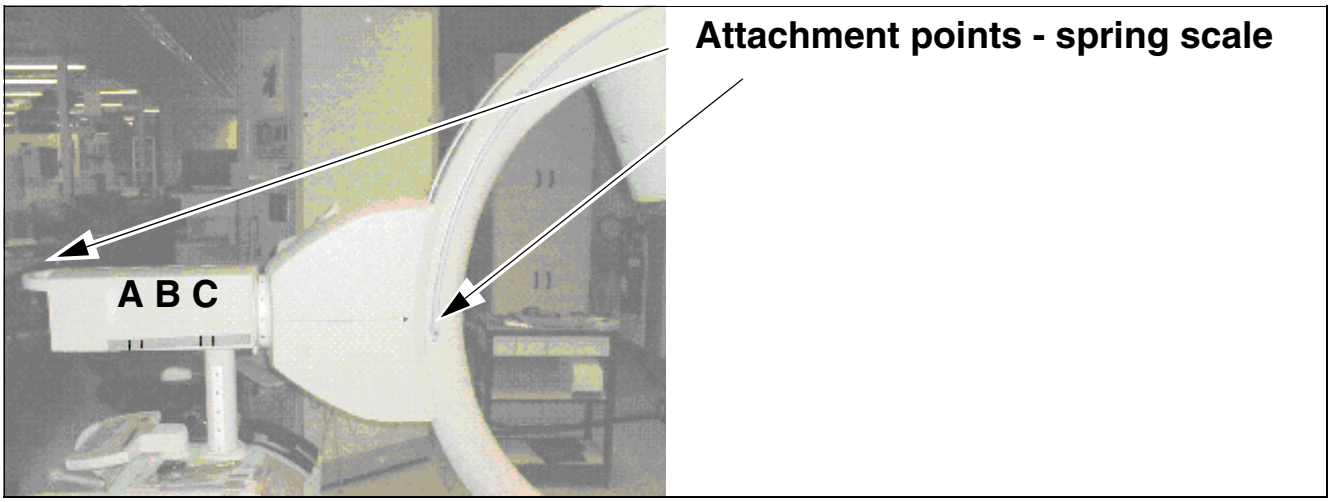

Fig. 1

Brake force / Brake torque

⚠WARNING

Risk of injuries on mechanical parts!
If not observed, slight to medium injuries, especially to the hands, can occur.

Observe the notes concerning the C-arm carbon fiber structure.

Measuring the horizontal force required for movement

The attachment point for the spring scale is the end of the railing near the image intensifier in sector B and/or the handgrip of the horizontal carriage. The carriage must always be pulled with a consistent speed.

- ➪ The maximum force for moving the horizontal carriage consistently when the brakes are released is 80 N.
- ➪ When the brakes are applied, the force must be ≥ 180 N.

Measurement A-C: At the handgrip of the horizontal unit, the measuring points move to 30, 170 and 200 mm

Measurement C-A: At the railing near the image intensifier, the measuring points move to 30, 170 and 200 mm

Measuring the horizontal swivel force

- ➪ Swivel force when the brakes are released max. 35 Nm.
- ➪ Swivel force when brakes are applied > 100 Nm.

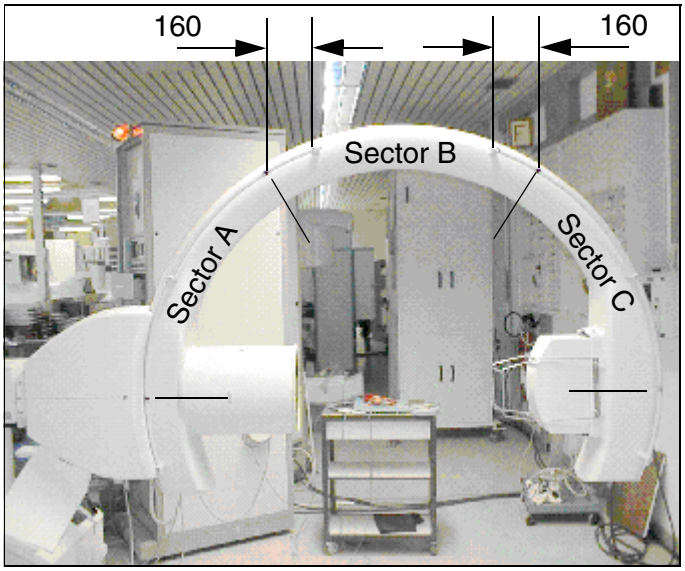

Fig. 2

Measuring the orbital force required for movement

The attachment point for the spring scale is the end of the railing near the image intensifier in sector B. The carriage must always be pulled along the C-arm with a consistent speed.

Movement when brakes are released

- C-arm in vertical position, the force used to move the C-arm consistently must not exceed 80 N.
- C-arm in horizontal position, the force used to move the C-arm consistently must not exceed 90 N.
- When brakes are applied, the force required for movement when the C-arm is in the vertical position is $\geq$ 100 Nm.

Measurement A-C: Start at 90° (RBV), pull spring scale to -90° (SIREPHOS)

The C-arm opening faces downward at the start of the measurement

Measurement C-A: Start at -90° (SIREPHOS), pull spring scale to 90° (RBV)

The C-arm opening faces downward at the start of the measurement

Measuring the angular force required for movement

The attachment point for the measurement is the railing next to the image intensifier, where the C-arm has an orbital position of 0° and an angulation of 0°.

- When the brakes are released, the force required for movement is between 20 and 30 N.
- When the brakes are applied, the force required for movement must exceed 100 N in order to move the C-arm.

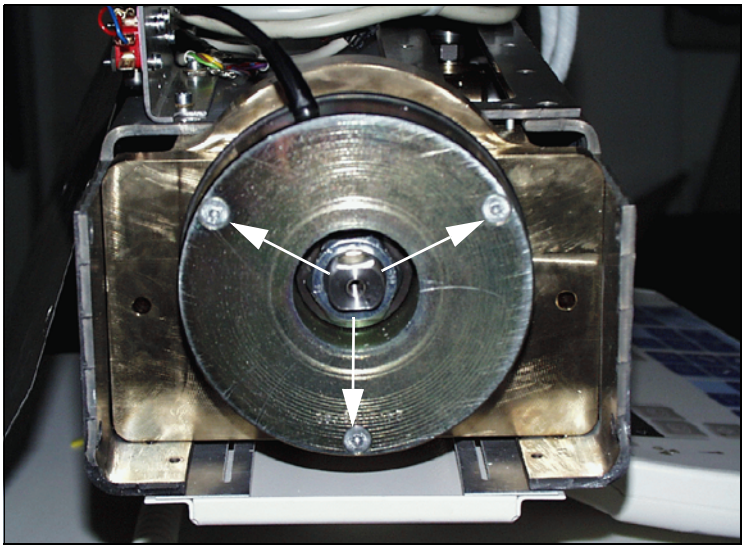

Fig. 3

Angulation brake magnet

⚠CAUTION	**Risk of burn!** **See Chapter 1, Safety Information.** **When the angulation brake is released, the brake magnet heats up. Be sure to switch off the power supply and let the brake magnet cool off before touching it.**

- Remove the cover of the horizontal carriage. Refer to chapter 1: Installation / removal of covers with brake switches on the horizontal carriage.
- Remove the back cover with the handle for the horizontal lift movement after removing the 4 countersunk screws. The angulation brake magnet is now visible.
- Remove the cover plate over the C-arm cable guide.
- Remove the three attachment screws and remove the brake magnet.

NOTE	**Remove both parts of the brake magnet!**

- Remove the plug connection for the brake magnet and insert the new brake magnet.
- Place the new brake magnet back on the shaft and attach it with the three screws.
- Reattach the cable with cable ties.
- Reattach the cover over the C-arm cable guide.
- Reinstall the cover. Make sure the protective conductor is connected properly.
- Perform a function test of the brake. Refer to: Brake force / Brake torque.

Horizontal swivel brake

⚠CAUTION	**Risk of burn!** **See Chapter 1, Safety Information.** **When the swivel brake is released, the brake magnet heats up. Be sure to switch off the power supply and let the brake magnet cool off before touching it.**

- The swivel brake replacement kit 56 44 955 includes the replacement instructions SPR2-230 841.02... Please use this instructions for performing the work steps.

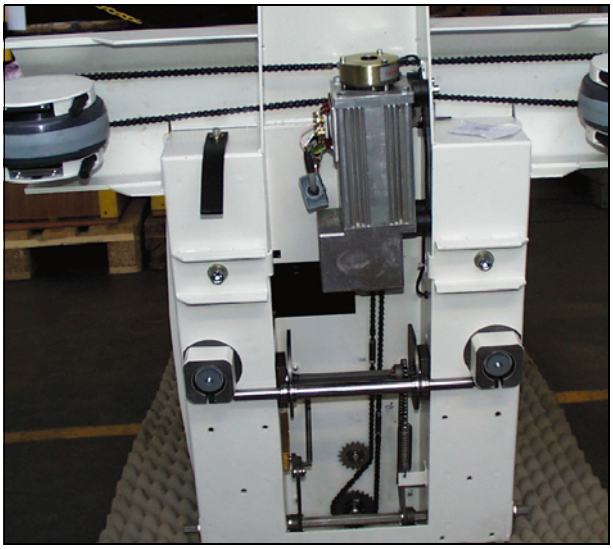

Fig. 4

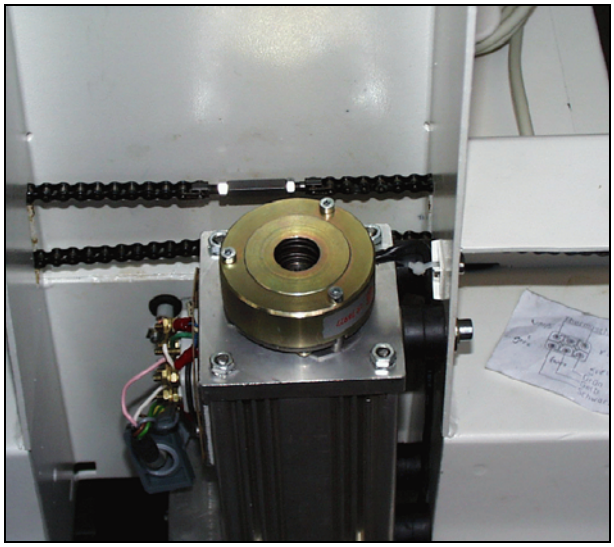

Fig. 5

Vertical lift brake

⚠WARNING

Risk of injury!
Noncompliance can lead to medium to severe injuries and/or property damage.

To replace the vertical lift brake, the SIREMOBIL Iso-C must be placed on its side. This requires 6 people. To prevent damage to the SIREMOBIL Iso-C or the floor, we recommend using several wool blankets or corrugated cardboard or other suitable floor covering.

- Remove the basic unit cover.
- Carefully place the SIREMOBIL Iso-C on its side.
- Remove plug D30.X8 and eject the contacts.
- Remove the three attachment screws for the vertical lift brake and replace the brake.
- Remove plug D30.X8.
- Eject the contacts from plug D30.X8.
- Route the wires of the new vertical lift brake to board D30 and insert the contacts in the plug housing.

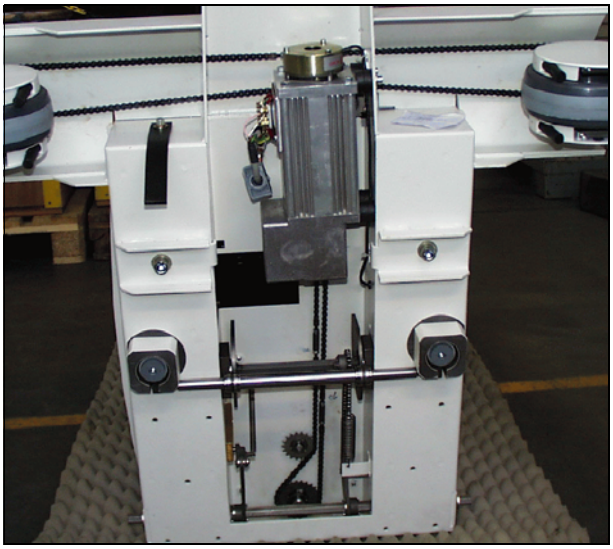

Fig. 6

Vertical lift motor

⚠WARNING

Risk of injury!
Noncompliance can lead to medium to severe injuries and/or property damage.

To replace the vertical lift motor, the SIREMOBIL Iso-C must be placed on its side.

This requires 6 people. To prevent damage to the SIREMOBIL Iso-C or to the floor, we recommend using several wool blankets or corrugated cardboard, or other suitable floor covering.

- Remove the vertical lift magnet from the vertical lift motor (three screws).
- Remove the attachment screws for the vertical lift motor.
- Remove the vertical lift motor with the gears from the spindle.
- Disconnect the wires from the frequency converter FU.
- Route the wires of the new vertical lift motor to the frequency converter FU and connect them.
- Place the new motor on the spindle. Make sure the spindle is seated correctly in the gears.
- Attach the motor with the screws.
- Install the vertical lift magnet on the vertical lift motor.
- Return the SIREMOBIL Iso-C to the upright position.
- Lubricate the spindle and the lifting column mounting.
- Check the vertical lift function. Also check that the vertical lift motor switches off at the end positions of the vertical lifting column. (limit switches).

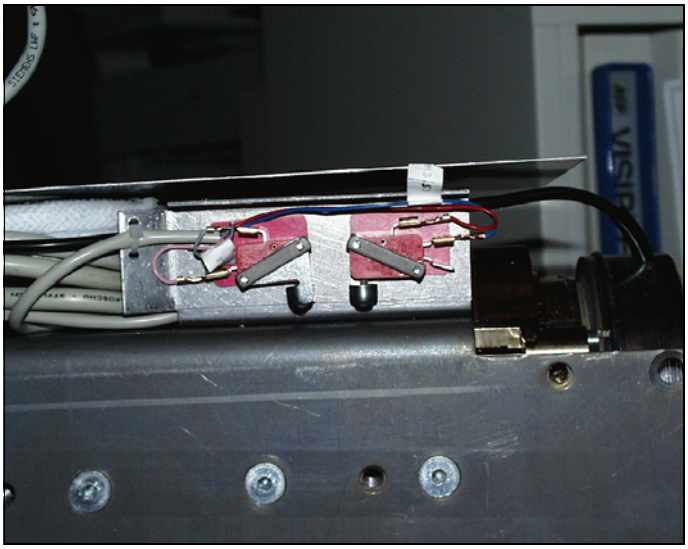

Fig. 7

Vertical lift limit switches

- Replace the limit switches. Reconnect the wires.
- To adjust the limit switches, move the lifting column slowly and carefully by briefly tapping the lifting column switch at the control console of the basic unit until it is positioned just before the mechanical end stop.
- Adjust the respective limit switch and tighten the screws.
- Make sure the limit switch functions correctly.
- To do this, move back out of the end position.
- Then slowly and carefully move to the end position by briefly tapping the lifting column switch on the control console of the basic unit.
- The lifting column motor must switch off prior to reaching the end position and the lifting column must come to a full stop.
- Move the lifting column approximately 10 cm away from the end position.
- Now move the lifting column at full speed in the direction of the end position by pressing and holding the lifting column switch.
- The lifting column motor must switch off prior to reaching the mechanical end stop and the lifting column must come to a full stop.

Switch for blocking vertical lift

- Remove the horizontal lift cover to replace both the switches. Refer to chapter 1 of these instructions.
  Adjustment: Refer to the MODULARIS service instructions.

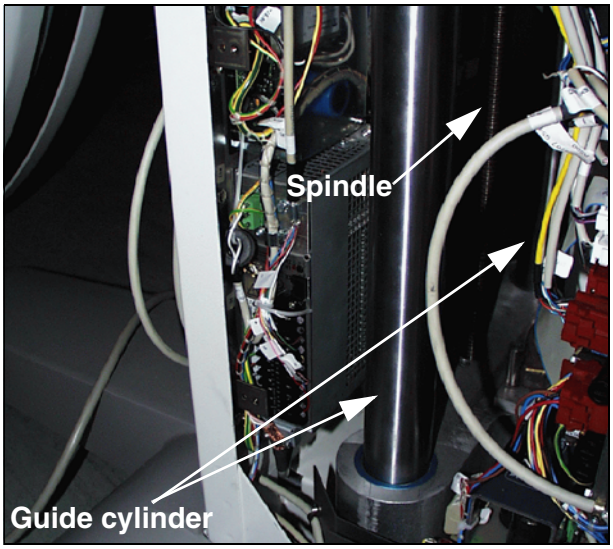

Fig. 8

Emergency off switch

- Loosen the cover above the horizontal carriage.
- Unsolder the emergency off switch.
- Replace the emergency off switch.
- Solder the wires on the emergency off switch.
- Reinstall the cover on the horizontal carriage.
- Check functioning of the emergency off switch.
  - Emergency off switch pressed: vertical lift must not be possible.
  - Emergency off switch released: vertical lift must be possible.

Lubricating the lifting column

Lubricate the spindle of the lifting column and the mounting of the guide cylinder once a year.

Spindle

- Lubricate the spindle with approximately 10 - 20 ml of "Optimol, Optipit" special oil.

Guide cylinder

- Grease the guide cylinder with approximately 5 - 10 ml of special bearing grease "Slick Pac PTFE" .
- Then move the lifting column through the entire travel range twice to ensure that the grease is evenly distributed.

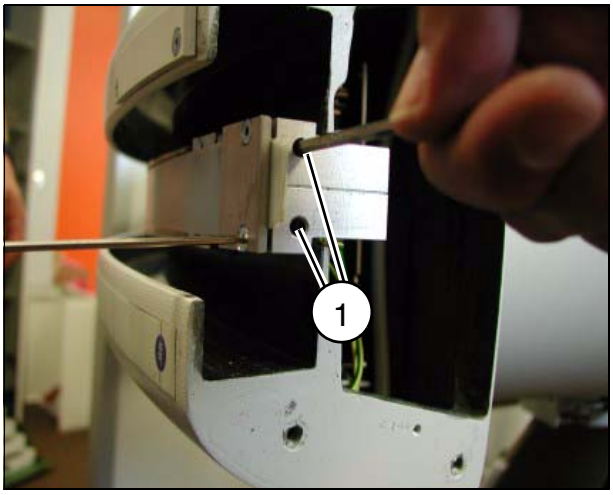

Fig. 9

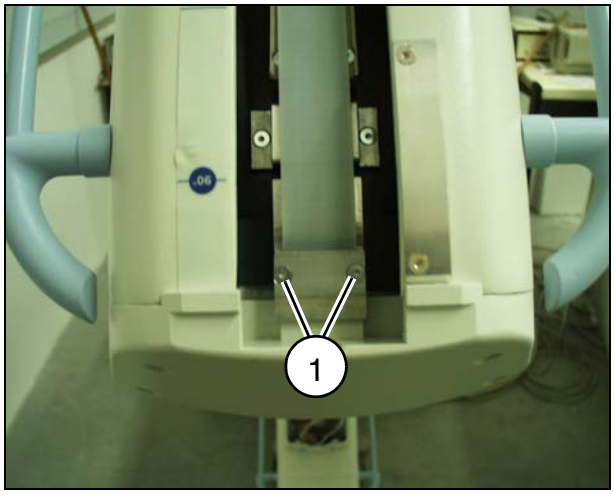

Fig. 10

Tensioning the drive belt

⚠WARNING

Risk of injuries on mechanical parts!
If not observed, slight to medium injuries, especially to the hands, can occur.

Observe the notes concerning the C-arm carbon fiber structure.

⚠WARNING

Risk of injury!
Noncompliance can lead to medium to severe injuries and/or property damage.

The C-arm covers contain counterbalance weights and weigh approx. 6 kg.
Hold the covers firmly when installing or removing them.
Before the C-arm cover will be loosened, the C-arm must be moved to its middle orbital position.
If the C-arm covers are loosened, the C-arm may not be moved to its orbital end positions (I.I. or SIREPHOS at the orbital end position).

- Move the C-arm to the middle orbital position.
- Remove the C-arm counterbalance weight on one side of the C-arm.
- Slacken the drive belt (1/Fig. 9).
- Loosen the holder of the drive belt (1/Fig. 10).
- Adjust the drive belt in the holder by one tooth to tension it. Then fasten it again.
- Reattach the holder of the drive belt.
- Tension the drive belt (1/Fig. 9).
- Reinstall the C-arm counterbalance weight.
- Repeat the procedure at the other end of the C-arm.

- After the counterbalance weights have been reinstalled on both sides, move the C-arm orbitally from one end to the other several times.
- In the case of SIREMOBIL Iso-C 3D, additionally perform a scan.
- If the belt tension is still insufficient, repeat the procedure and place the belt into the next tooth to shorten it further.

NOTE

When measuring the tube current, the distribution current must be derived from the measured value. The distribution current depends upon the kV and is calculated according to Ohm's law. The distribution resistance is 400 MOhm.

- Switch OFF SIREMOBIL.
- Remove jumper X97 from board D1.
- Connect the mA measuring device at D1.X39 and D1.X40.
- Switch ON SIREMOBIL.

- Release radiation and read the overall current.
- Read out the kV value produced while the current is being measured.

Calculate the tube current as follows:

$$\text{tube current [mA]} = \text{overall current [mA]} - \frac{\text{high voltage [kV]}}{\text{distribution resistance [MOhm]}}$$

e. g:

At 110 kV, an overall current of 5.275 mA is measured.

$$\text{tube current [mA]} = 5.275\ \text{[mA]} - \frac{110\ \text{[kV]}}{400\ \text{[MOhm]}} = 5.275\ \text{[mA]} - 0.275\ \text{[mA]} = \underline{5.0\ \text{[mA]}}$$

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Changes to previous version 9 - 1

Chap. 0	Cover page, revision level, table of contents revised
Chap. 1 to Chap. 9	Revision level revised
Chap. 1	Required tools, measurement and auxiliary devices new revised
	Safety information added
Chap. 6 and 7	Safety information added.
Chap. 9	Changes to previous version revised

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